

**U.S. GEOLOGICAL SURVEY
M2M LAB BUILDING
NASA AMES RESEARCH CENTER
PARCEL 15**

SECTION 106 TECHNICAL REPORT

SMITHGROUP

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GRAY & PAPE
HERITAGE MANAGEMENT



TABLE OF CONTENTS

1.0 INTRODUCTION	3
1.1 Purpose	3
1.2 Project Location	3
1.2 Project Team	3
2.0 DESCRIPTION OF UNDERTAKING	6
2.1 Project Description	6
2.2 Site Improvements	6
2.3 Ground Disturbing Activities	6
3.0 AREA OF POTENTIAL EFFECT	8
4.0 IDENTIFICATION OF HISTORIC PROPERTIES	9
4.1 Archaeological Resources	9
4.2 Architectural Resources	11
4.3 Identification of Historic Properties	14
4.4 Affected Historic Properties	27
5.0 ASSESSMENT OF EFFECTS	28
6.0 CONCLUSION	38
7.0 APPENDICES	39
Appendix A: Site Plan	
Appendix B: Annotated Elevations	
Appendix C: Supporting Visual Exhibit – Renderings	
Appendix D: Supporting Visual Exhibit – Visual Impact Analysis	
Appendix E: Supporting Visual Exhibit - Existing Features and Materials in NAS Sunnyvale Historic District	
Appendix F: Civil Site Plan	
Appendix G: Select Historic Photos	
Appendix H: Gray & Pape Cultural Resources Assessment Letter Report	
Appendix I: TEECOM Pile Driving Vibration Impact Assessment	
Appendix J: Gray & Pape Primary Record Form for Building 006	

1.0 INTRODUCTION

The United States, through the National Aeronautics and Space Administration (NASA), holds a fee simple interest in the Moffett Federal Airfield (MFA) and NASA Ames Research Center (NASA ARC). As the lead federal agency, NASA is responsible for compliance with the National Historic Preservation Act of 1966, as amended through 2006, including Section 106, 36 CFR Section 800, which requires federal agencies to take into account the effects of their activities and programs on historic properties.

1.1 PURPOSE

NASA has entered into an agreement with the United States Geological Survey (USGS) to acquire Parcel 15 within the US Naval Air Station (NAS) Sunnyvale Historic District on the NASA Ames Research Center (ARC) to build a new 2-story facility of approximately 50,000 sq ft called the M2M Lab Building to support relocating their research programs from their existing facility at their Menlo Park Campus.

1.2 PROJECT LOCATION

Parcel 15, the location for this project, is located at the southeast corner of the US NAS Sunnyvale Historic District within the NASA ARC. NASA ARC is located at the south end of San Francisco Bay, between the cities of Mountain View and Sunnyvale, in Santa Clara County, California approximately 27 miles southeast of San Francisco International Airport, and 6 miles northwest of San Jose International Airport. The US NAS Sunnyvale Historic District, also known as the Shenandoah Plaza National Historic District was listed in the National Register of Historic Places (NRHP) in 1994 (NRHP #94000045).

A Project Vicinity Map is included in Figure 1; a Location Plan is included in Figure 2, the Enlarged Location Plan is shown in Figure 3.

1.3 PROJECT TEAM

This study was prepared by James W. Shepherd, AIA, Principal and Director of Preservation and Susan Pommerer, AIA, Principal and Project Manager, SmithGroup, both of whom meet the Secretary of the Interior's Professional Qualification Standards (36 Code of Federal Regulations (C.F.R.) Part 61) for Historic Architecture. The findings were prepared in consultation with Christopher R. Polglase, RPA, and Carrie Albee, MA, Gray & Pape, Inc., who meet the Secretary of the Interior's Professional Qualification Standards for Archaeology and Architectural History, respectively.



FIGURE 1: PROJECT VICINITY MAP - NASA AMES RESEARCH CENTER

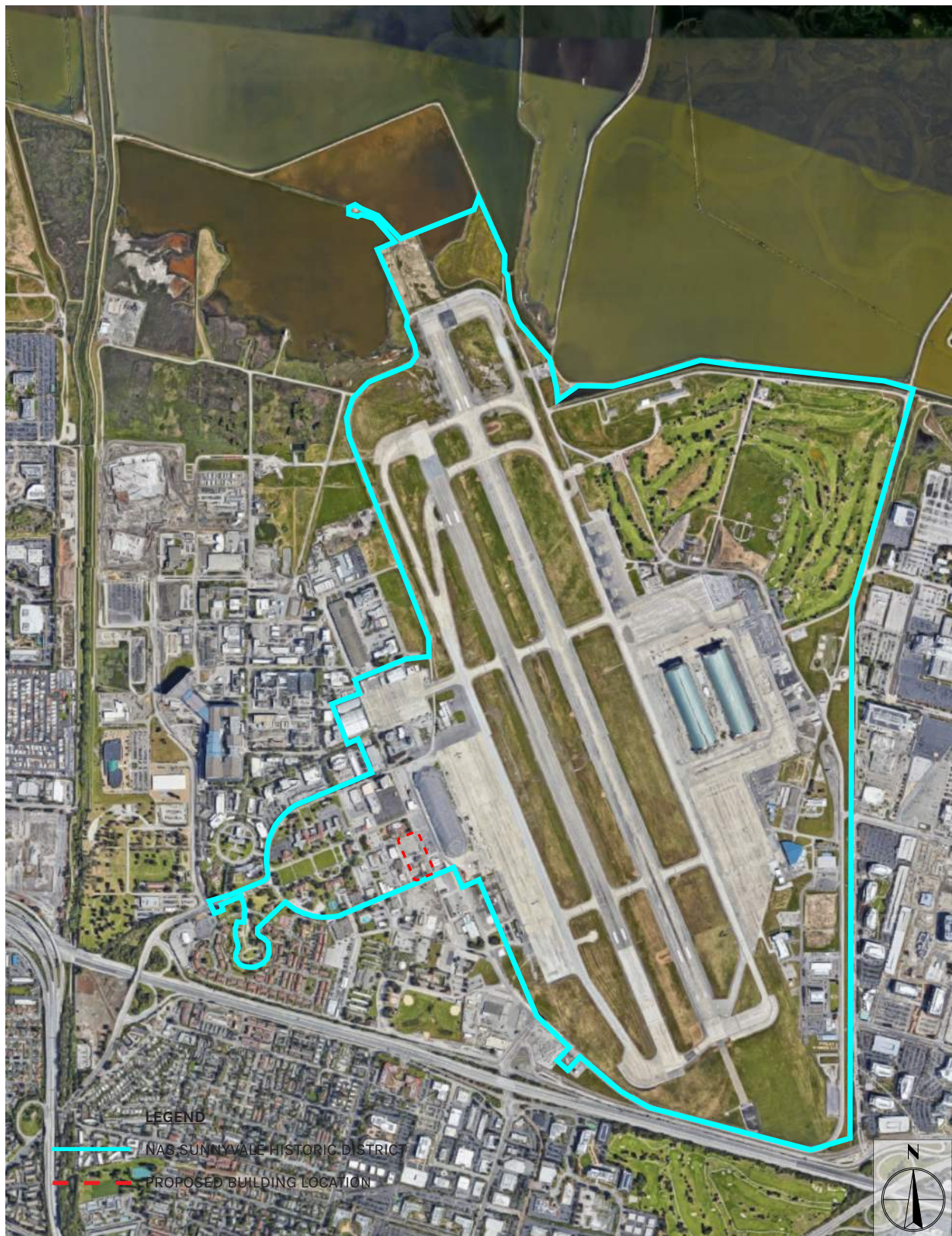


FIGURE 2: LOCATION PLAN - NAS SUNNYVALE HISTORIC DISTRICT BOUNDARIES AND PROPOSED BUILDING LOCATION

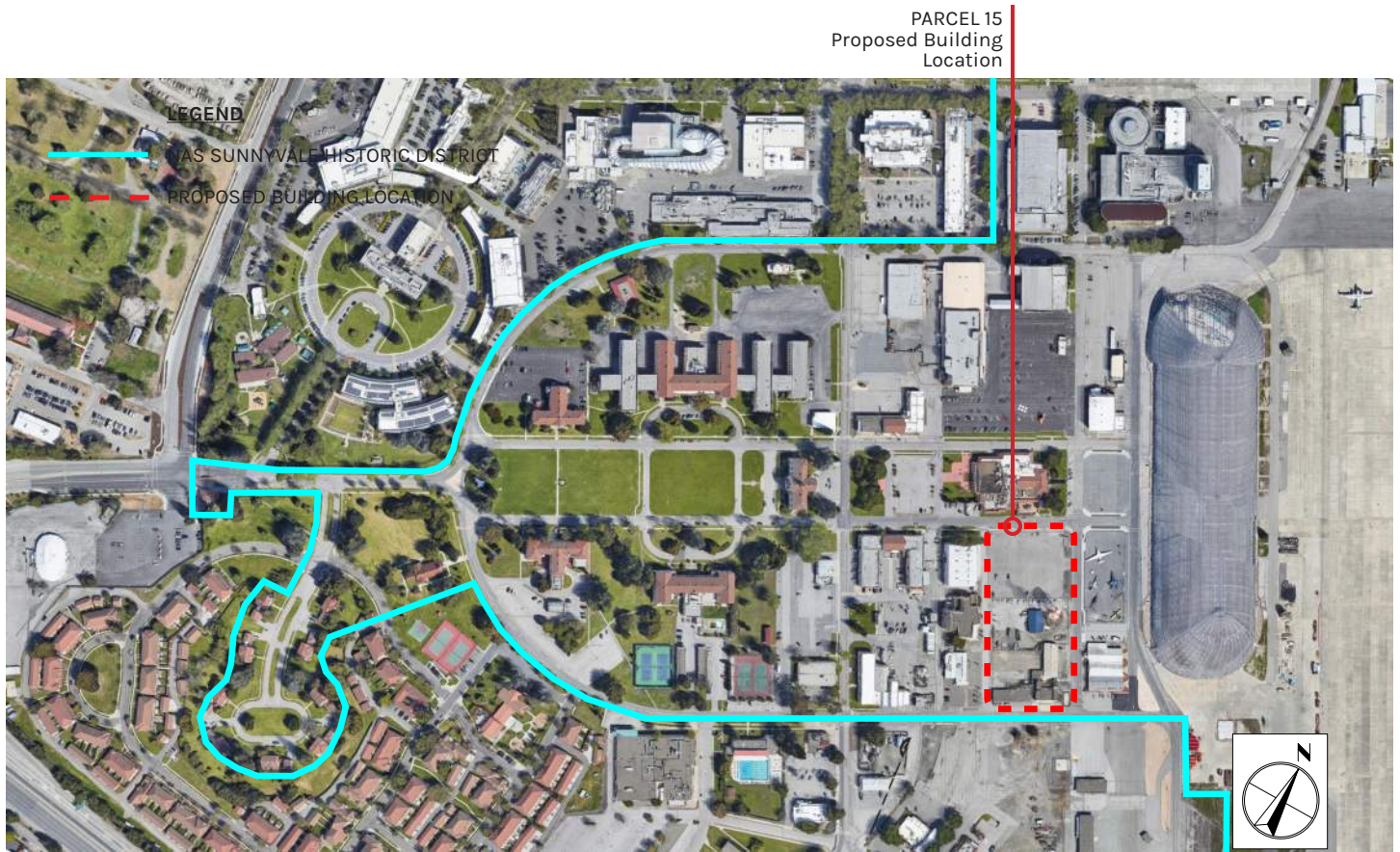


FIGURE 3: ENLARGED LOCATION PLAN - AREA OF PROPOSED BUILDING LOCATION

2.0 DESCRIPTION OF THE UNDERTAKING

2.1 PROJECT DESCRIPTION

The purpose of the Undertaking is to create a new research facility for USGS within NASA ARC on Parcel 15 that can serve as an instrument for their science and a reflection of their role as the largest earth science enterprise. The project will create a 2-story building of approximately 50,000 sq ft that will house a multidisciplinary group of programs and users. This project, called the USGS M2M Lab Building, aims to create a long lasting and durable facility to withstand long-term intense use with safety as a primary planning and systems driver. The new building supports the relocation of the USGS research programs from their current facilities at the Menlo Park Campus. The new facility's 30,000 sf of labs space includes: wet chemistry labs, light industrial dry labs, and shops. The dry labs will serve as an earthquake science center focusing on studying historic impacts of earthquakes on rock formations to better predict future seismic activities. The wet labs will focus on the study of the earth's geology such as researching geomagnetic history and its changes. The work that happens in these labs has historic impact on contributions to the field of geologic research by inventing experiment techniques, equipment setups and protocols.

2.2 SITE IMPROVEMENTS

Two-thirds of the existing Parcel 15 site is currently surface parking. The Undertaking will provide upgraded parking and access to the site, including restriping and area lighting, accessible parking spaces, and accessible paths of travel. There will be new paving, grading, landscaping, and site utilities integrated into the project as well. Any existing paving outside of the footprint of Parcel 15 that is disturbed due to the installation of new utilities that support the project will be patched in-kind. The new design includes an entrance oriented to South Akron Road, with new sidewalks and plantings that encourage pedestrian access from the west portion of the NAS Sunnyvale Historic District to the building. The entry plaza will include new landscaping with a bioswale to improve the areas water ecology. A self-guided rock garden exhibiting some of the USGS research work will complement this new landscaping.

2.3 GROUND DISTURBING ACTIVITIES

The Undertaking includes new utilities for electrical service, fire lines, domestic water and sewer, and telecommunications. Existing utility lines will be re-used to the extent feasible, and new lines will be sited to minimize ground disturbance and reduce potential impacts to subsurface archaeological resources. The water, sewer and electrical service will tap into existing campus utilities along South Akron Road. An emergency generator will be installed on the south portion of Parcel 15 within a fenced enclosure. An existing abandoned steam tunnel and existing water pipes run below ground and through Parcel 15 (depth to be determined). These utilities historically supported connection of the Building 010 - Plant Engineering & Maintenance Shop and Building 005 - Water Tower to Building 001 - Hangar 1. The portions of these abandoned utility lines that overlap Parcel 15 will be removed as part of the Undertaking.

The Undertaking will also require ground disturbance for the installation of building foundations installed at a depth of approximately 7 ft below grade to support the proposed two-story "L" shaped structure. Additionally, 131 piles at a typical depth of between 55 and 65 feet will be driven into the ground to support these foundations.

There are a series of existing utility structures on Parcel 15 that are non-historic and are in very poor condition. These sheds and utility structures will be removed in preparation for the Undertaking. Additionally, Building 006 - Mixed Use Warehouse, a 1933 utility that currently serves as recycling storage located on the southern edge of Parcel 15 will be maintained as part of the Undertaking, but later additions to this structure that date to 1947 and 1967 respectively will be removed.

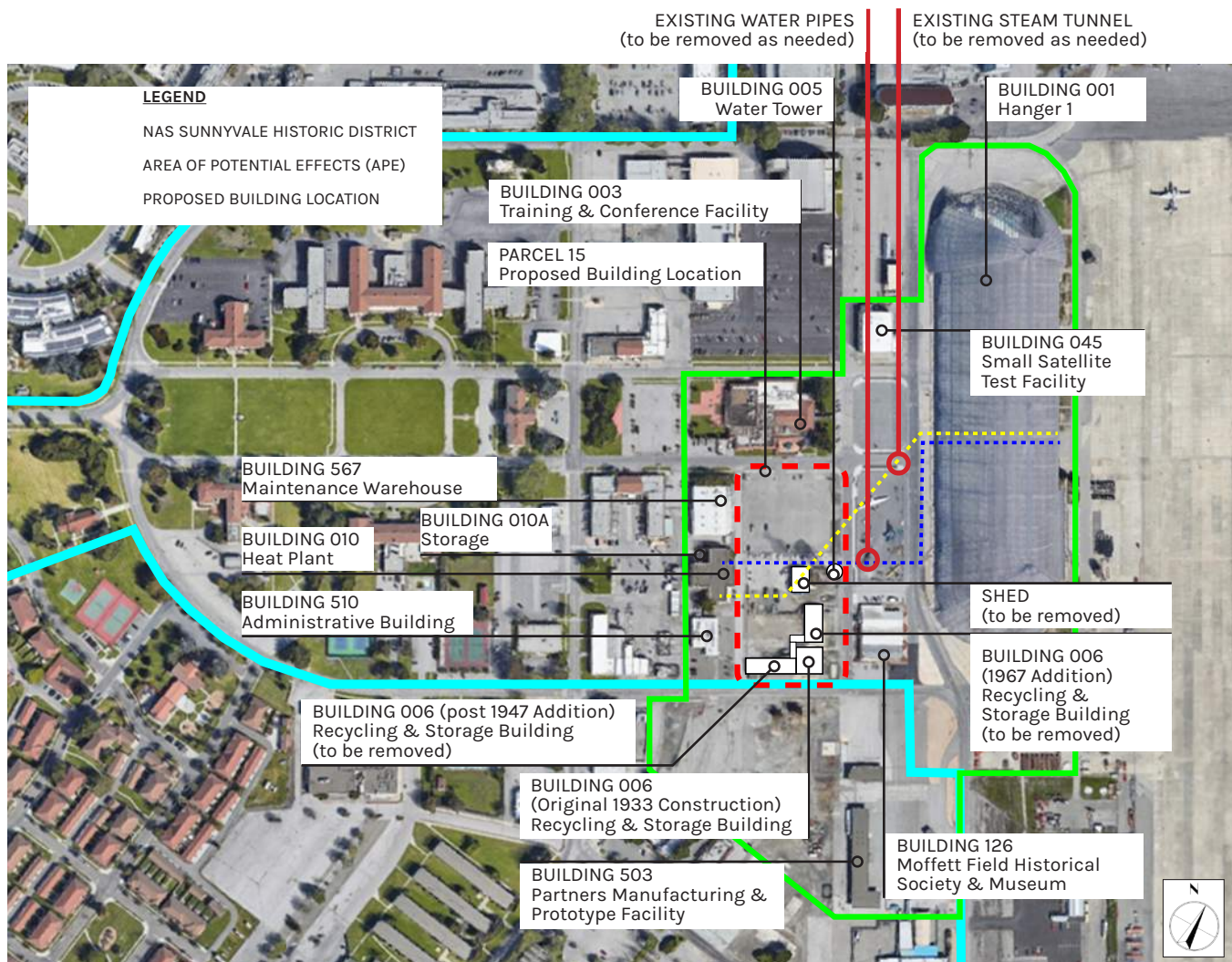


FIGURE 4: NASA ARC - PARCEL 15 SITE AND SURROUNDING BUILDINGS

3.0 AREA OF POTENTIAL EFFECTS

The Area of Potential Effects (APE) is defined as the geographic area within which an Undertaking that may directly or indirectly cause alterations in the character or use of historic properties (36 Code of Federal Regulations (CFR) Part 800, Protection of Historic Properties, Section 800.16(d)). These changes may include physical destruction, damage, or alteration of a property; change in the character of the property's use or of physical features within its setting that contributes to its historic significance; and introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features (36 CFR 800.5(a)(2)). The locations of various known and potential historic properties within the Project vicinity have been carefully considered.

The APE was defined to encompass the first tier of buildings adjacent to the project's footprint (See Figure 5). The APE overlaps the NAS Sunnyvale Historic District; therefore, the entire district is considered as a historic property within the APE. For archaeological resources, the APE was defined as the limits of the project area with a maximum limited excavation depth of 8 feet, including areas of temporary staging and construction ground disturbance. Due to the planned piles to be installed the APE extends to a depth of 65 feet, the maximum depth of the piles. The APE includes all areas where historic properties may be affected by the project.

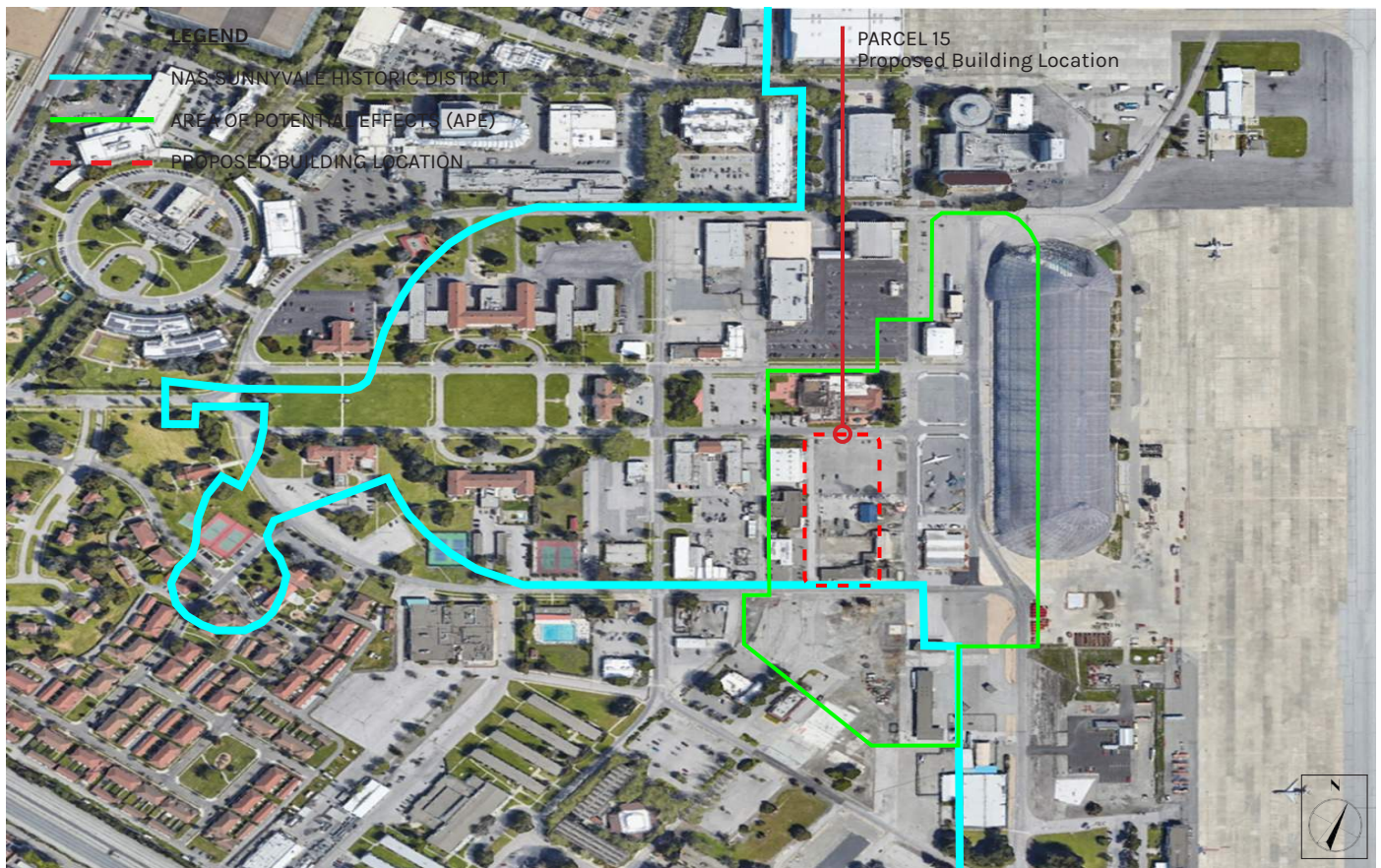


FIGURE 5: AERIAL MAP SHOWING AREA OF POTENTIAL EFFECTS (APE) FOR THE USGS M2M LAB BUILDING PROJECT

4.0 IDENTIFICATION OF HISTORIC PROPERTIES

Historic properties, as defined in 36 CFR Section 800.16(1)(1), include any district, site, building, structure, or object that is included in or eligible for listing in the National Register of Historic Places (NRHP).

4.1 ARCHAEOLOGICAL RESOURCES

This archaeological assessment is based upon a review of technical studies prepared for NASA ARC by AECOM during the past decade, including an archaeological resources study (dated February, 2017) and an Integrated Cultural Resources Management Plan (ICRMP) (dated November 2014).

The NASA Ames Research Center Archaeological Study was prepared by AECOM to provide guidance for archaeological resources management and project planning at NASA ARC in support of NASA's obligations under the National Historic Preservation Act of 1966 (NHPA) and other federal mandates.¹ The study identified the potential for archaeological resources at NASA ARC through a review of prior surveys, previously recorded resources, historic maps, Sacred Land Files from the Native American Heritage Commission, and geotechnical investigations conducted at NASA ARC.

The AECOM study found that there are relatively few recorded archaeological sites within NASA ARC and the potential for NRHP-eligible resources is somewhat limited, due to the development of the site by the U.S. Navy and NASA during the twentieth century. The data reviewed by AECOM allowed their team to prepare a series of maps that illustrate areas of anticipated archaeological sensitivity. The AECOM study identified four tiers of archaeological sensitivity:

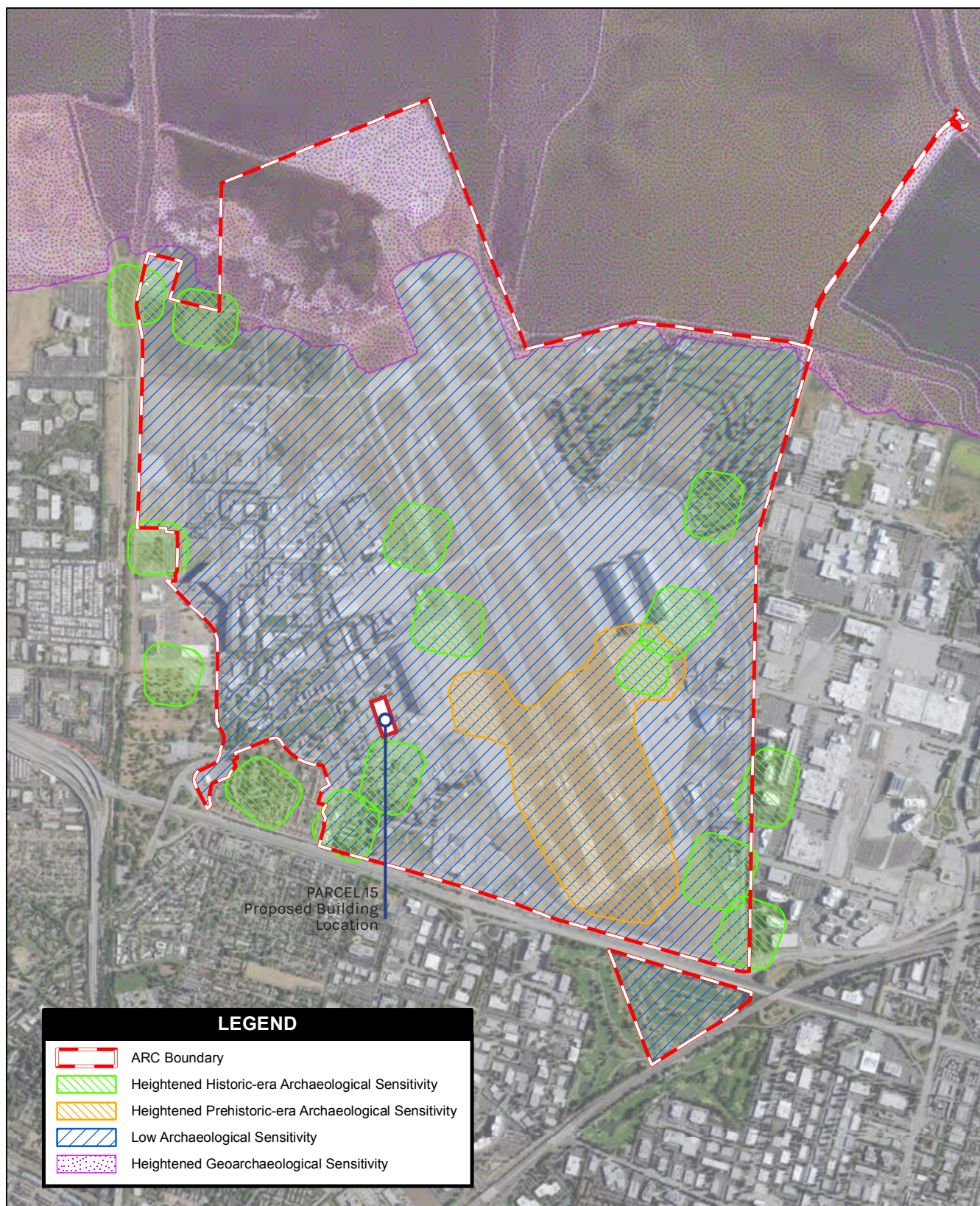
- **Heightened Historic-Era Archaeological Sensitivity:** This map illustrates generalized areas of heightened historic archaeological sensitivity based on the map-project locations of historic farmsteads and other structures prior to 1931. These areas of sensitivity are focused primarily on farmsteads and/or mapped structures from the mid-nineteenth century to the first decade of the twentieth century.
- **Heightened Prehistoric-Era Archaeological Sensitivity:** This map illustrates generalized areas of heightened prehistoric archaeological sensitivity areas that the AECOM team believe are most likely to contain prehistoric materials that existed prior to the development of the facility and where intact deposits or features might have survived the construction activities on the site.
- **Heightened Geo-archaeological Sensitivity:** This map illustrates generalized areas of heightened prehistoric archaeological sensitivity that the AECOM team believe are most likely to contain minimally disturbed buried prehistoric materials.
- **Low Archaeological Sensitivity:** Areas within NASA ARC that were not designated within the previous categories were determined to have a low potential for containing archaeological resources.

The study received concurrence from the SHPO on June 22, 2017 as a baseline study for archaeological planning.

The site of the current Undertaking has not been subject to a previous archaeological survey.² However, according to AECOM's analyses and as presented in Figure 16 of their report, the Undertaking is located in an area of Low Archaeological Sensitivity. The closest area of Heightened Prehistoric-Era Archaeological Sensitivity to Parcel 15 is located approximately 250 meters to the east, on the opposite side of Building 001 - Hangar 1. The closest area of Heightened Historic-Era Archaeological Sensitivity to Parcel 15 is located on the opposite side of Wescoat Road from Parcel 15. This area of Heightened Historic-Era Sensitivity reflects the map-projected location of one of a handful of widely scattered structure(s) illustrated in the 1876 Thompson and West Atlas and possibly on the 1897 USCGS Mountain

1 AECOM, "NASA Ames Research Center: Archeological Resorces Study," February 2017.

2 AECOM, "NASA Ames Research Center: Archeological Resorces Study," February 2017. Figure 7.



ARC Composite Archaeological Sensitivity

NASA Ames Research Center Archaeological Resources Study

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Figure 16

FIGURE 6: NASA ARC COMPOSITE ARCHAEOLOGICAL SENSITIVITY MAP; PARCEL 15 WITHIN LOW ARCHAEOLOGICAL SENSITIVITY ZONE

View and Alviso T-Sheet. It should be noted that this area of archaeological sensitivity incorporates a 250-foot buffer from the actual map-projected location.

Based on the fact that the historic maps illustrate land use in the nineteenth century characterized by dispersed, widely scattered farmsteads, and given the anticipated large-scale earthmoving activities that would have been associated with construction of U.S. Naval Air Station (NAS), Sunnyvale California during the 1930s, it is reasonable to expect that few features or deposits associated with a mid- to late-nineteenth farmstead would have survived within Parcel 15, if any features or deposits were once present. The prior development of Parcel 15 almost certainly would have significantly impacted prehistoric features or deposits that might have been located here prior to construction of NAS Sunnyvale. AECOM's characterization of the area around Parcel 15 as having low potential for containing significant archaeological resources is supported by Gray & Pape's review of the available data.

Section 106 of the NHPA requires that Federal agencies consider the effects of their Undertaking on historic properties, which are specifically defined as those that are listed in or eligible for listing in the NRHP. It is unlikely that the APE contains archaeological historic properties and an archaeological survey does not appear to be warranted.

4.2 ARCHITECTURAL RESOURCES

The reference document that was instrumental in determining whether the Undertaking may have potential effect on the historic resources within the APE was the National Register Nomination for the Historic District: U.S. Naval Air Station Sunnyvale, California Historic District National Register of Historic Places Nomination, Bonnie Bamburg, Urban Programmers, 1994. This historic district was expanded in 2013 to include the airfield and its component features although the nomination has not formally been updated to include these areas.³ The Undertaking does fall within the boundary of the NAS Sunnyvale Historic District.

US NAS Sunnyvale Historic District

The United States Naval Air Station Sunnyvale was created in 1933 with the construction of Building 001 - Hangar 1 to serve as a docking station for the USS Macon, a dirigible and the largest aircraft in the world at that time as part of the Navy Airship program. The Sunnyvale base was one of two Naval Air Stations built to port lighter-than-air dirigibles during the 1930's. Hangar 1 and the later added structures for smaller blimps (Hangars 2 & 3 constructed in the 1940's) and the surrounding support buildings all represent excellent examples of early twentieth-century military planning, engineering and construction.

Hangar 1 was nominated by the Navy Chief of Naval Operations as a U.S. Navy Historic Site on January 3, 1966. The United States Naval Air Station Sunnyvale, CA Historic District was nominated by the US Navy to be placed on the NRHP and the nomination was accepted on February 24th, 1994. This Historic District is also known as U.S. Naval Air Station Moffett Field 1935 Central Historic District and Shenandoah Plaza National Historic District. The Historic District was accepted for meeting the evaluation Criteria A related to the events that occurred on the site and Criteria C for the design and construction of the campus and buildings.

Periods of Significance

The US NAS Sunnyvale Historic District as listed in the NRHP is a non-contiguous historic district with two periods of significance. Period 1 (1930-1935) reflects the early history of the site related to the dirigible program when Hangar 1 was constructed, and a complex of buildings were built to support administrative functions. Period 2 (1942-46) represents the time during WWII when the site was returned to the US Navy and recommissioned as Naval Air Station Moffett Field. During this time the Navy expanded facilities with the construction of Hangar 2 and 3. In 2013, NASA did determine that

3 AECOM Historic Properties Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California, 2013

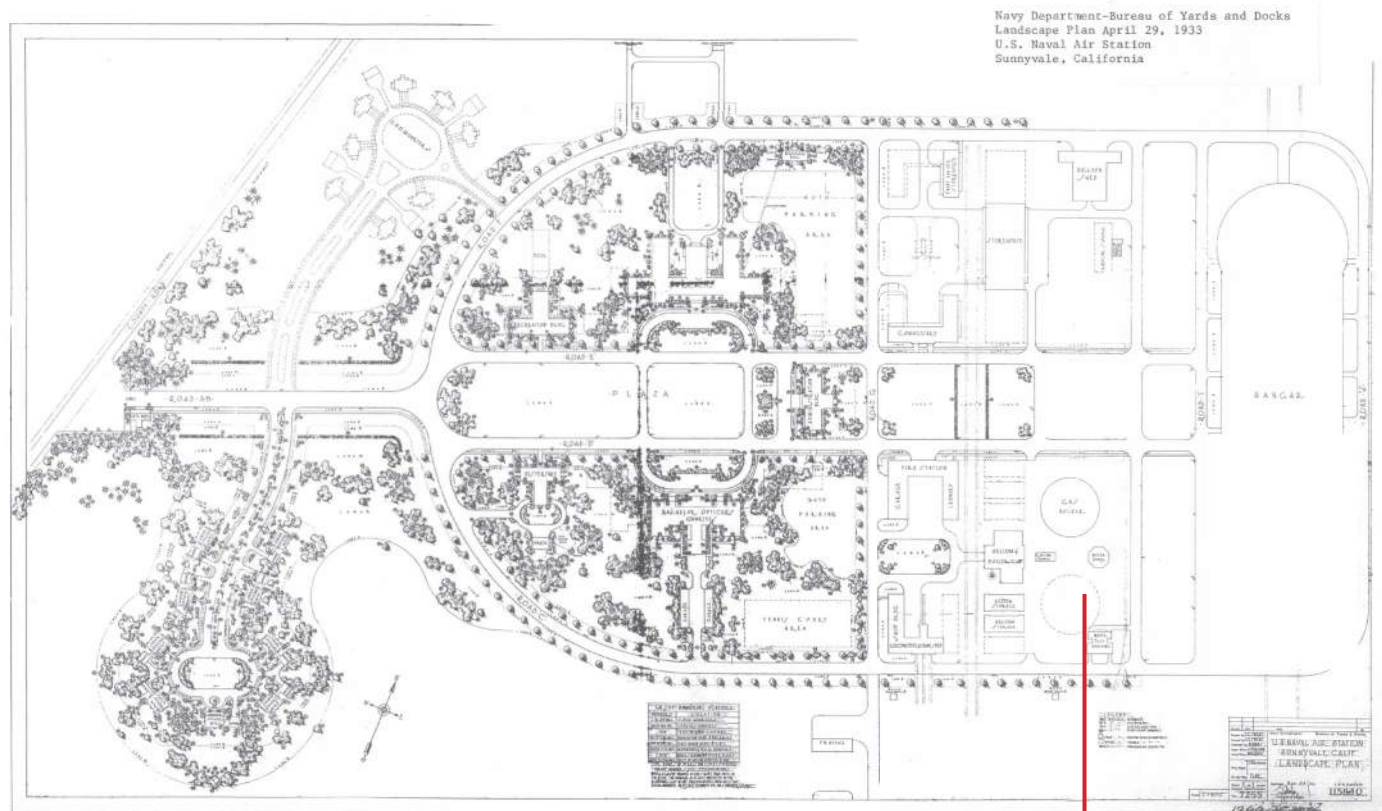


FIGURE 8: AERIAL MAP INDICATING ARCHITECTURAL STYLE ZONES WITHIN THE NAS SUNNYVALE HISTORIC DISTRICT IN AREAS SURROUNDING PROPOSED BUILDING LOCATION ON PARCEL 15

additional features were eligible for listing in the National Register under Criteria A as contributors to the NAS Sunnyvale Historic District with an additional Period of Significance of 1942-1961.⁴

Site Characteristics

The 1933 master plan for the US Naval Air Station Sunnyvale site laid out a coherent core with a central area oriented on a northeast oriented axial plan with Hangar 1 serving as the visual termination of this historic core. This grid layout and associated landscaping is significant as an example of the Navy Bureau of Yard's and Dock's adherence to good planning design. Buildings were symmetrically placed along a grand central green. A formal gated entrance at the west end of the plan leads to the open green space that is flanked by boulevards and surrounded by mature specimen trees, shrubs and manicured lawns. The site is organized in three stylistic sections. The Spanish Colonial Revival designed buildings were more public, housed administrative functions and were clustered around the formal green defining the site north of McCord. The service buildings are oriented to the south of McCord road and represent a more streamlined Spanish Mission Revival design that is more utilitarian in nature. The formal layout of this plan affords many vistas with a culmination of Hangar 1 which serves as the dominant feature of the site and is an Art Modern expression of engineering.

Architectural Classification

Per the NRHP the architectural classifications for the Historic District were; late 19th and 20th Century Revivals, Mission/Spanish Colonial Revivals, and Other – Dirigible Hangar/WWII Blimp Hangar. Additionally, the strongest identifying features for the site were divided into five main components:

- A. Original Spanish Colonial Revival Design
- B. Significant Engineering Features (Hangars 1,2, 3)
- C. Miscellaneous Supportive Design Features
- D. Post 1935 buildings designed in the Spanish Colonial/Mission Revival Style
- E. International Style Buildings from the 1940's

Per the NRHP, the proposed Historic District included all features identified with items A, B & C above.

Stylistic Characteristics

The predominant style of the 1930's buildings that form the Historic District and core of the campus to the west of McCord Avenue is the Spanish Colonial Revival. These buildings are characterized by a low two-story height with white or off-white stucco vertical surfaces and very low-pitched Spanish terracotta tile roofs. The buildings are all rectangular in plan with either central projecting spaces or corner wings. Wall surfaces are plain with interruptions of rectangular shaped windows, slightly projecting string courses between floors and round arched entryways and arcades.

A streamlined style of the Mission/Spanish Colonial Revival is used for the more utilitarian support buildings to the east of McCord Avenue and includes flat roofs with articulated parapets, stucco walls with projecting string course, multi-paned windows in metal frames and sash with vertical expression and recessed entries with wood or metal doors.

The third stylistic expression on the site comes from the three hangars with Hangar 1 being the most dominant and visible of the three. The metal sheathed structure was influenced by the Streamline Moderne style.

Landscaping

Landscaping also contributes to the significant design elements on the site. The formal layout of trees and plantings support the axial layout of boulevards and complement the historic architecture. These plantings also help to support the campus like setting of the site and unify the disparate styles and types of structures.

Parcel 15

The location of the Undertaking is on Parcel 15 which falls within the more utilitarian zone of the US NAS Sunnyvale Historic District. During the first period of significance of this Historic District, Parcel 15 housed utilitarian structures such as a helium storage tank and water tanks to support the functions of Hangar 1.

4.3 ARCHITECTURAL RESOURCES ASSESSMENT

Twelve (12) individual properties and one district are located within the APE for the proposed Undertaking. All of the properties have been evaluated for listing in the NRHP as part of one or more of the following built resource studies, described in more detail in the NASA ARC ICRMP:

- National Register of Places District Nomination: US Naval Air Station Moffett Field (Urban Programmers, 1991), which resulted in the listing of the NAS Sunnyvale Historic District under Criteria A and C in 1994;
- Final Inventory and Evaluation of Cold War Era Historical Resources, Moffett Federal Airfield and NASA Crows Landing Flight Facility (SAIC, 1999), which determined 148 resources to be ineligible for listing;



FIGURE 9: NASA ARC PARCEL 15 SITE AND SURROUNDING BUILDINGS

- Hangar 1, Moffett Field Naval Air Station, Historic American Engineering Record #CA-335 (Page & Turnbull, 2006); and
- Historic Property Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California (AECOM, 2013), which recommended expansion of the NAS Sunnyvale Historic District to include the airfield.

While several other built resource studies have been conducted at NASA ARC, they did not address the properties within the APE for the proposed Undertaking. To date, no comprehensive gate-to-gate survey and NRHP evaluation of built resources at NASA ARC has been conducted.

No field survey or original research was performed by this team for this Section 106 submission with the exception of the evaluation of Building 006 - Mixed Use Warehouse (Appendix J). However, review by Gray & Pape of readily available information on the properties provided sufficient information to enable a good-faith preliminary identification of known and potential historic properties located within the APE. A brief summary of those findings is presented below.

US Naval Air Station Sunnyvale, California Historic District (1930-1961)

Recommendation: Eligible per AECOM 2013

The US Naval Air Station (NAS) Sunnyvale, California Historic District (NRIS Reference No. 94000045) was listed in the NRHP in 1994 for its association with the expanding defense capabilities of the U.S. Navy, the engineering technology found in lighter than air ships, the design of the hangar and system for porting the dirigible and in the plan and architectural style of the station designed to support this defense technology. The district was found to possess national significance under Criteria A and C in the areas of Military and Engineering, with two periods of significance from 1930-1935 and 1942-1946. In 2013, AECOM conducted a survey and NRHP evaluation of the airfield at Ames and recommended that the NRHP-listed historic district should be expanded to include the airfield, and the period significance extended from 1930-1961.

For the purposes of this Section 106 submission, Gray & Pape recommends that the US Naval Air Station Sunnyvale, California Historic District be defined as presented in the 2013 AECOM report.

Building 001 – Hangar 1 (1933)

Recommendation: Individually eligible, contributing to district

Hangar 1 has been extensively researched and recorded over the past 30 years for its engineering significance and for its role in housing the Naval airship U.S.S. MACON dirigible. According to the HAER documentation it has been determined individually eligible for listing in the NRHP and it is a contributing resource to the US Naval Air Station Sunnyvale, California Historic District.

Gray & Pape concurs with these determinations and recommends that for the purposes of this



FIGURE 10: BUILDING 001 – HANGAR 1

Section 106 submission, Hangar 1 be treated as individually eligible and a contributing resource to the identified historic district.

Hangar 1 is a metal sheathed structure and its rounded shape is the epitome of the aerodynamically influenced Streamline Moderne style and mimics the design of the very blimps it was meant to house. The structure provides the focus for the 1933 campus master plan. The structure is important for the Streamline Moderne architectural design, the unique engineering construction, and for its very size that still dominates the landscape today.

Building 003 – Training & Conference Center (1933)

Recommendation: Contributing to district

In the 1933 landscape plan for the US Naval Air Station Sunnyvale, California (see Figure 7) the building shown in this location is identified as a Café. Later it became the Officers Club. The existing building on the site, constructed in 1933, exhibits the design characteristics of a Spanish Mission-style hacienda, although it is clear from looking at the building in its current condition, and historic aerial imagery, that it has been expanded from its original configuration. The 1991 NRHP nomination form for the Historic District identifies Building 003 as non-contributing due to lack of integrity. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape at this time, Building 003 is understood to have performed an integral function to the US Naval Air Station Sunnyvale, California. While the resource exhibits substantial alteration from its original 1933 configuration, it is not clear to what extent the alterations may or may not fall within the expanded period of significance for the Historic District. Photographic sources suggest that the building retains enough of its character-defining features to convey its historic use and to contribute to the Historic District.

As an individual resource, it is not likely that Building 003 would be NRHP eligible individually. As a Spanish Mission Revival-style building, it is typical of military installations of the period and it is not known to be an outstanding or well-preserved example of the style. Its known functions since its construction – Café, Officers' Club, Conference Center – are commonplace support functions within



FIGURE 11: BUILDING 003 - TRAINING & CONFERENCE CENTER

the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 003 be treated as a contributing resource to the US Naval Air Station Sunnyvale, California Historic District.

Building 005 – Water Tower & Storage (1932)

Recommendation: Contributing to district

Building 005 is the original Water Tower for the US Naval Air Station Sunnyvale, California. Now abandoned in place, the Water Tower is a readily-identifiable and distinctive feature from the first period of construction at Ames that appears to have been changed little since then. The 1991 NRHP nomination form for the Historic District identifies Building 005 as a contributing resource. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape at this time, Building 005 performed an integral albeit utilitarian function within the US Naval Air Station Sunnyvale, California. As an individual resource, it is visually and functionally commonplace to military installations of the period and is not expected to possess significance independently of the Historic District.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 005 be treated as a contributing resource to the US Naval Air Station Sunnyvale, California Historic District.

The Water Tower is a utilitarian structure that once supplied water to Building 001 – Hangar 1. Supported by a tall steel frame, the Water Tank is topped with a conical roof. The traditional red and white checkered paint defines this classic industrial design. The Water Tower is a functional and visually distinctive feature on the site and is located on Parcel 15, the project site for the Undertaking.

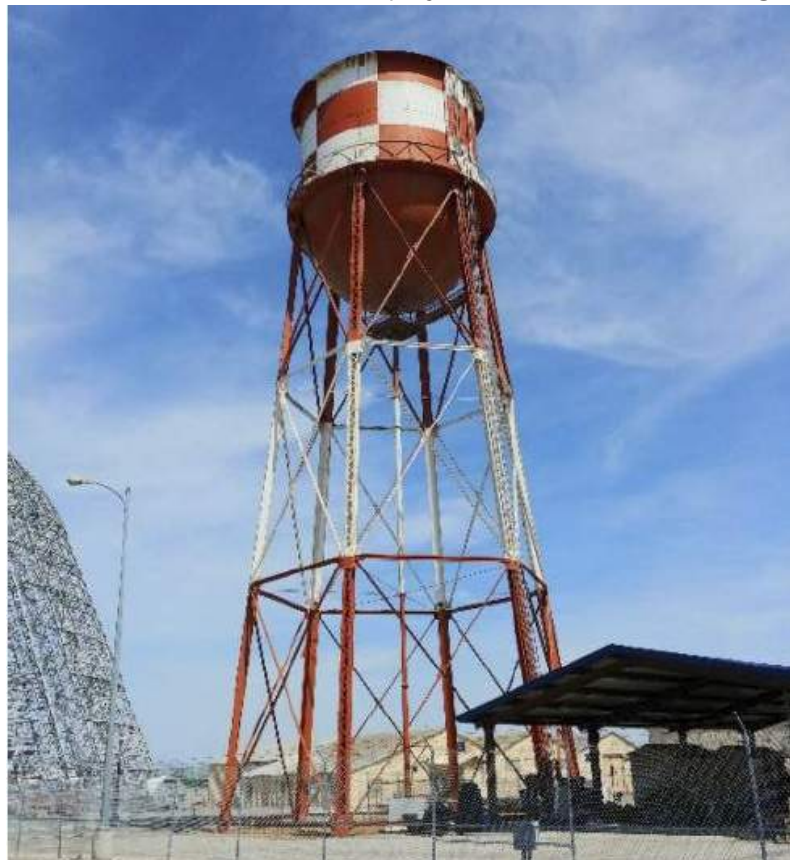


FIGURE 12: BUILDING 005 - WATER TOWER

Building 006 – Mixed Use Warehouse (1933, 1947, 1967)

Recommendation: Contributing to district

Building 006, historically known as the Motor Test Building, was completed in 1933 as part of the original campus at the US Naval Air Station Sunnyvale, which was solely dedicated to the housing, maintenance, and operation of the USS MACON (ZRS-5) dirigible. Building 006 was originally constructed for the purpose of motor testing in direct support of the USS MACON, which was housed 300 feet to the northeast in Hangar 001. The USS MACON was only in service from 1933 to 1935, after which the US Naval Air Station Sunnyvale was briefly transferred to the US Army Air Corps until 1942, when it was returned to the Navy. During World War II the US Naval Air Station airfield was expanded to accommodate the Navy's largest transport aircraft. Building 006 appears to have continued to serve as a motor/engine test facility through at least 1947, when the southwest extension was constructed.

As the mission of the US NAS Sunnyvale changed, so too did the use of Building 006. From 1950 to 1961 the US NAS Sunnyvale was the home base for the Navy's aircraft carrier squadrons and their fighter jets (AECOM 2013). Contemporary records suggest that Building 006 housed a flight simulator/trainer and an electrical shop. In 1962 the primary mission of the base shifted to Navy antisubmarine warfare in the Pacific Ocean and in particular, training on Lockheed P3 Orion (AECOM 2013). Documentary photos show that the northwest extension was built at this time (between 1965 and 1967), although its specific purpose is unclear. A 1989 plan for Building 006 shows that its technical functions had ceased and it was to be renovated as a travel office. Following the transfer of the US Naval Air Station Sunnyvale to NASA in 1994, Building 006 was repurposed for maintenance and recycling. Currently Building 006 is described as a mixed-use warehouse in NASA's Real Property Management System.

The NRHP nomination form for the US NAS Sunnyvale Historic District identifies Building 006 as non-contributing due to lack of integrity. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated. Based upon the information available to Gray & Pape at this time, Building 006 is part of the original campus of US NAS Sunnyvale and is understood to have performed an integral function during the short period of operation of the USS MACON from 1933 to 1935. The original 1933 block remains intact and recognizable and as such able to convey the historical significance necessary to contribute to the NRHP-listed historic district.

The ca. 1947 southwest extension to Building 006 is within the expanded NRHP period of significance (1930-1961) for Moffett Field as recommended by AECOM in 2013. The ca. 1947 extension represents a continuation of Building 006's motor/engine test function, which was an important activity at US NAS



FIGURE 13: BUILDING 006 - MIXED USE WAREHOUSE

Sunnyvale during the original and expanded periods of significance. However, in its current condition, the extension does not retain the integrity necessary to convey this historical function.

The ca. 1967 northwest extension to Building 006 was constructed outside of the original and expanded periods of significance for the US NAS Sunnyvale Historic District, and as such does not support the historical significance of Building 006 as a contributing resource.

No information was uncovered during this study to support the NRHP eligibility of Building 006 as an individual resource. It is a utilitarian support building with no known significant design or engineering aspects, or any other known associations, that would merit individual eligibility.

Building 010 – Plant Engineering & Maintenance Shop (1932)

Recommendation: Contributing to district

Building 010 is the original helium and boiler plant for the US Naval Air Station Sunnyvale, California, and as such has a direct relationship to the operation of the U.S.S. MACON. Documentary photographs show that the plant was immediately adjacent to helium storage structures and a natural gasholder, suggesting that the plant drew in natural gas from the gasholder, extracted the helium, and stored it until it was pumped to Hangar 1 via underground tunnels. After the termination of the Navy Lighter-than-Air program, it appears that the building retained its more typical function as a heat plant for the installation. Subsequent uses include maintenance shop and storage. The building incorporates Spanish Mission-style design elements and with the exception of the smokestack, which is no longer extant, has been little altered since its original construction. The 1991 NRHP nomination form for the historic district identifies Building 010 as a contributing resource. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape at this time, Building 010 original performed an important role in the operation of the U.S.S. MACON, and thereafter an integral albeit



FIGURE 14: BUILDING 010 - PLANT ENGINEERING & MAINTENANCE SHOP

utilitarian function as a heat plant within the US Naval Air Station Sunnyvale, California. As an individual resource, the plant is not expected to possess significance independently of the Historic District. The Spanish Mission style is widespread in the region, nor is it known to be unique among heat plants at military installations of the period. Possible individual eligibility as a helium plant has been considered, but given that this function terminated in the 1940s, it is unlikely that the interior retains the equipment or configuration necessary to convey that significance.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 010 be treated as a contributing resource to the US Naval Air Station Sunnyvale, California Historic District.

The Heat Plant, also known as the Boiler Plant facility, contributes to the Historic District under the first Period of Significances as an example of the steam lined style of Mission/Spanish Revival that is a predominant style within the utilitarian are of the campus. It is one of the original 1933 buildings and is significant for its bold architectural design with ornament stripped down to the essence of simplified entrance surrounds and arched windows to support industrial use. While directly across from Parcel 15 along Dugan Avenue, its primary facade and entrance is on the opposite (east) side of the building and is oriented to a court around which other buildings are oriented. Its secondary facade (or back facade faces Parcel 15. It is a two-story “T” shaped structure with one story inserts on the west facade. Its facades are of a warm colored stucco with a projecting string course and include metal frames and sashes. The windows have fixed and tilt-panels with rectangular panes divided by mullions, and emphasize verticality. Most of the first-floor windows and all of the second- floor windows have operable transoms. The entry is recessed and has wood and metal doors.

Building 010A – Chemical Feed & Storage for Bldg. 010 Boiler (1996)

Recommendation: Non-contributing to district

Building 010A is a very small utilitarian support structure located immediately adjacent to Building 010. While functionally it supports Building 010, a contributing resource to the historic district, its date of construction is well outside of the period of significance. There is no indication that Building 010A has ever been evaluated for NRHP eligibility under any context.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 010A be treated as a non-contributing resource to the US Naval Air Station Sunnyvale, California Historic District.



FIGURE 15: BUILDING 010A - CHEMICAL FEED & STORAGE BUILDING

Building 045 – Small Satellite Test Facility (1944)

Recommendation: Contributing to district

No information on the original function or history of this building was found during this study. According to NASA's records it was built in 1944, and this is supported by documentary photographs from the period. In the 2000s the resource was described as Public Works Paint Shop. The 1991 NRHP nomination form for the historic district identifies Building 045 as a non-contributing resource, but no reason is provided. The building is not explicitly addressed in AECOM's proposed historic district expansion, as the resource was outside of the airfield study area. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 045 be treated as a contributing resource to the US Naval Air Station Sunnyvale, California Historic District.



FIGURE 16: BUILDING 045 - SMALL SATELLITE TEST FACILITY

Building 126 – Moffett Field Historical Society (1949)

Recommendation: Contributing to district

The Cold War study, completed in 1999, describes Building 126 as “three prefabricated metal gable-roofed interconnected buildings set on a concrete foundation.” It indicates that the building was originally used as a warehouse, and later as a railroad museum and storage. The study evaluated the NRHP eligibility of Building 126 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

The 1991 NRHP nomination form for the historic district identifies Building 126 as a non-contributing resource, presumably because it was constructed outside the period of significance. The building is not explicitly addressed in AECOM's proposed historic district expansion, as the resource was outside of the airfield study area. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that the potential eligibility under contexts other than the Cold War has ever been evaluated.

Recent photographs show that Building 126 is typical of semi-permanent military construction of the 1940s, and that it retains integrity to that period. As such, the building is not likely to possess historical significance individually under Criterion C. Nor is the building known to have supported a significant function that would merit consideration outside of the historic district.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 126 be treated as a contributing resource to the US Naval Air Station Sunnyvale, California Historic District.



FIGURE 17: BUILDING 126 - MOFFETT FIELD HISTORICAL SOCIETY & MUSEUM

Building 503 – Partners Manufacturing & Prototype Facility (1966)

Recommendation: Not Eligible

The Cold War study indicates that at that time Building 503 was functioning as the Navy Exchange Service Station. Designed as a gas station by Rudolph & Sheeten and completed in 1966, the building, while utilitarian, reflects the influence of Mid-20th-Century stripped down Modernism, typical of Federal construction of the period. The study evaluated the NRHP eligibility of Building 503 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989). Building 503 is outside of the original and expanded boundaries of the US Naval Air Station Sunnyvale, California Historic District, and as such was not addressed in the 1991 or 2013 district studies. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

Little information on Building 503 was available for this preliminary evaluation, nor were current photographs of the resource and its context reviewed. NASA real property records indicate that while identified as a single asset, Building 503 consists of one large building and several ancillary buildings and/or structures of unknown construction date. It is not clear if the ancillary resources predate the current use of the facility (i.e., Partners Manufacturing & Prototype Facility). Based upon information contained in the Cold War study resource form, Building 503 was a typical fueling station on a military installation, and as such is not likely to be individual eligible for listing in the NRHP.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 503 be treated as individually ineligible for listing in the NRHP.



FIGURE 18: BUILDING 503 - PARTNERS MANUFACTURING & PROTOTYPE FACILITY

Building 510 – Administrative Building (1967)

Recommendation: Non-contributing to district; Not Individually Eligible

Building 510 occupies the former location of helium storage structures that originally supported the helium plant (Building 010). As the Navy's Lighter-than-Air program terminated in the 1940s, it is likely that the helium storage structures were demolished and the site remained vacant until the construction of Building 510 in 1967. The Cold War study describes Building 510 as "two interconnected prefabricated ribbed metal buildings with medium-pitched gable roofs." It indicates that the building's original use is unknown and at the time served as a NASA maintenance office. The study evaluated the NRHP eligibility of Building 510 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

Building 510 is outside of the original and expanded periods of significance of the US Naval Air Station Sunnyvale, California Historic District, and as such would not contribute to the district. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

As an individual resource, it is not likely that Building 510 would be NRHP eligible individually, as it is a utilitarian support building with no known significance. Its function as maintenance and administrative office space in recent years further suggests a lack of individual significance, as these are commonplace support functions within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 510 be treated as a non-contributing resource to the US Naval Air Station Sunnyvale, California Historic District, and individually ineligible for listing in the NRHP.



FIGURE 19: BUILDING 510 - ADMINISTRATIVE BUILDING

Building 567 – Facilities Maintenance Warehouse (1978)

Recommendation: Non-contributing to district; Not Individually Eligible

Located immediately adjacent to the former helium plant (Building 010), Building 567 occupies a space originally planned for helium storage, but documentary photographs indicate that the land remained vacant until the 1950s. It appears that Building 567 replaced this earlier 1950s building, whose function is unknown. The Cold War study describes Building 567 as “a pre-fabricated ribbed metal building with a shallow-pitched metal roof,” that originally served as a warehouse and was at the time being used as a public works warehouse. The study evaluated the NRHP eligibility of Building 567 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

Building 567 is outside of the original and expanded periods of significance of the US Naval Air Station Sunnyvale, California Historic District, and as such would not contribute to the district. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

As an individual resource, it is not likely that Building 567 would be NRHP eligible individually, as it is a utilitarian support building with no known significance. Pre-fabricated metal warehouses like this one are commonplace within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 567 be treated as a non-contributing resource to the US Naval Air Station Sunnyvale, California Historic District, and individually ineligible for listing in the NRHP.



FIGURE 20: BUILDING 567 - FACILITIES MAINTENANCE WAREHOUSE

Building 570 – Maintenance Storage (JCM) (1996)

Recommendation: Non-contributing to district; Not Individually Eligible

Building 570 is a very small utilitarian support structure located immediately adjacent to Building 010. The Cold War study describes Building 570 as “a square flat-roofed building covered with metal panels” constructed in 1978 and at the time used as maintenance storage. The study evaluated the NRHP eligibility of Building 570 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

Building 570 is outside of the original and expanded periods of significance of the US Naval Air Station Sunnyvale, California Historic District, and as such would not contribute to the district. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

As an individual resource, it is not likely that Building 570 would be NRHP eligible individually, as it is a utilitarian support building with no known significance. Prefabricated metal storage sheds like this one are commonplace within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 570 be treated as a non-contributing resource to the US Naval Air Station Sunnyvale, California Historic District, and individually ineligible for listing in the NRHP.

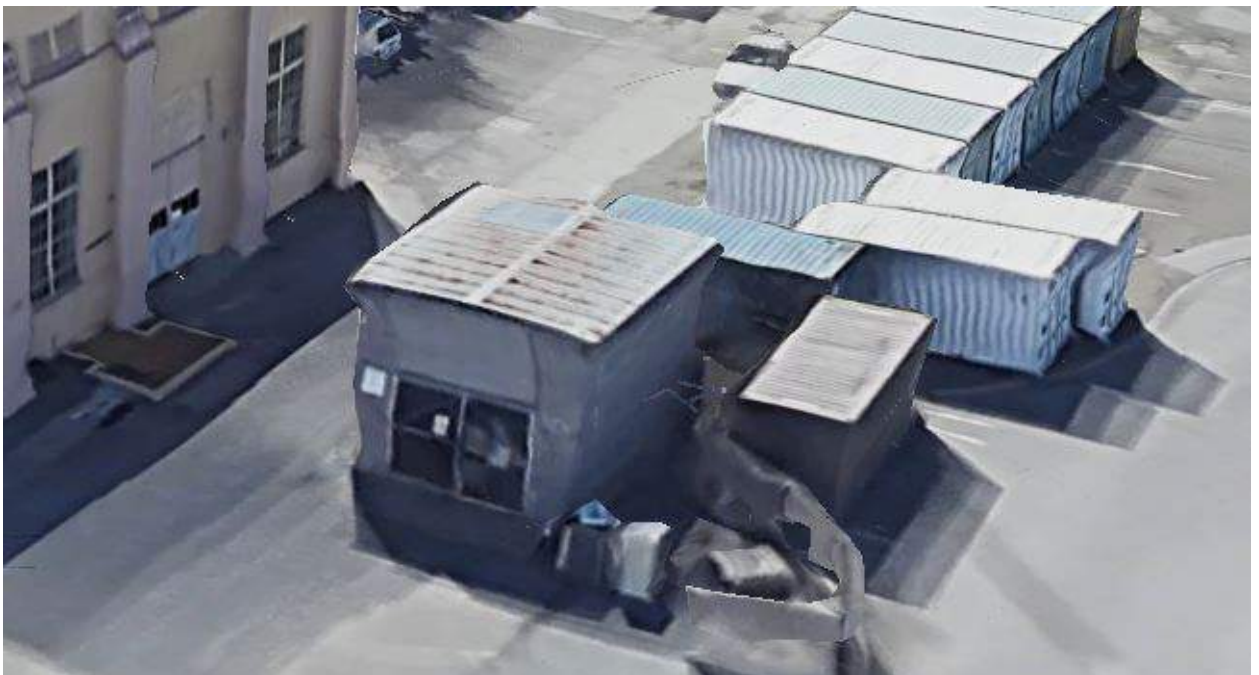


FIGURE 21: BUILDING 570 - MAINTENANCE STORAGE

SURVEYED ARCHITECTURAL RESOURCES IN THE APE

Resource No.	Resource Name	Resource Type	Date of Construction	In the Historic District?	Existing NRHP Evaluation Status	Gray & Pape Recommendation	Comment
N/A	U.S. Naval Air Station Sunnyvale, California Historic District	District	1930-1961	N/A	Listed	Eligible, as described by AECOM in 2013	None
001	Hangar One	Building	1933	Y	Listed, Contributing to District	Eligible, Individually	None
003	Training & Conference Center	Building	1933	Y	Non-Contributing to District	Eligible, Contributing to District	Original to District; Lack of integrity not established
005	Water Tower & Storage Tank	Structure	1932	Y	Listed, Contributing to District	No additional recommendation	No known or expected significance outside of District
006	Mixed Use Warehouse	Building	1933	Y	Non-Contributing to District	Contributing to District	Original to the District; 1933 section remains intact; No known or expected significance outside of the District
010	Plant Engineering Maintenance Shop	Building	1932	Y	Listed, Contributing to District	No additional recommendation	No known or expected significance outside of District
010A	Chemical Feed & Storage for Bldg. 010 Boiler	Building	1996	Y	Non-Contributing to District	No additional recommendation	Outside of the District period of significance; No known or expected significance outside of the District
045	Small Satellite Test Facility	Building	1944	Y	Non-Contributing to District	Eligible, Contributing to District	Within the District period of significance; Lack of integrity not established; No known or expected significance outside of the District
126	Moffett Field Historical Society	Building	1949	Y	Non-Contributing to District	Eligible, Contributing to District	Within the District period of significance; Lack of integrity not established; No known or expected significance outside of the District
503	Partners Manufacturing & Prototype Facility	Building(s)	1966	N	Not Eligible	No additional recommendation	Utilitarian, common type; No known or expected significance individually or within another district
510	Administrative Building	Building	1967	Y	Not Eligible	No additional recommendation	Utilitarian, common type; No known or expected significance individually or within another district
567	Facilities Maintenance Warehouse	Building	1978	Y	Not Eligible	No additional recommendation	Utilitarian, common type; No known or expected significance individually or within another district

570	Maintenance Storage (JCM)	Building	1996	Y	Not Eligible	No additional recommendation	Utilitarian, common type; No known or expected significance individually or within another district
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4.4 AFFECTED HISTORIC PROPERTIES

US NAS Sunnyvale Historic District

The APE for this Undertaking is mostly within the NAS Sunnyvale Historic District (see Figure 5 – APE). This Historic District is spread over 124 acres and its 1994 NRHP included 22 contributing buildings/structures, 9 contributing houses with associated garages, and 3 monuments. The Historic District was expanded in 2013. The Historic District straddles the large open runways of the Moffett Federal Airfields with Hangars #2 & #3 being on the other side of those runways forming the remainder of the historic structures. Per Gray & Pape’s assessment, seven contributors to this district, Buildings 001, 003, 005, 006, 010, 045, and 126 are located within the APE and represent the range of stylistic contributions to this Historic District. These buildings as well as the US NAS Sunnyvale Historic District are considered affected historic properties as part of this Undertaking.

5.0 ASSESSMENT OF EFFECTS

The Criteria of Adverse Effect pursuant to 36 CFR 800.5(a)(1) are applied to assess effects of the undertaking on historic properties within the APE:

(1) Criteria of adverse effect. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

To comply with Section 106, the criteria of adverse effects are applied to historic properties in the proposed Area of Potential Effects (APE), pursuant to 36 CFR Part 800.5(a)(1). A finding of no adverse effect may be appropriate when the Undertaking's effects do not meet the threshold set forth in the criteria of adverse effect, or conditions are imposed to ensure review of plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. If a finding of adverse effect is made, mitigation is proposed and resolution of adverse effect occurs through consultation in accordance with 36 CFR Section 800.6(a) to avoid, minimize or mitigate adverse effects on historic properties.

Several examples of adverse effects are listed in 36 C.F.R 800.5(a)(2). The following assessment examines the Undertaking under each of those examples, including analysis of compliance with the Secretary of the Interiors Standards.

i. Physical destruction of or damage to all or part of the property

The Undertaking in subject would damage or destroy only one of the historic properties on Parcel 15 and within the NAS Sunnyvale Historic District. In this subject matter, Building 005 - Water Tower on Parcel 15 shall remain unaltered in the pursuit of this Undertaking (both Phase 1 and Phase II). Previous archaeological reports have indicated that the Undertaking is located in a "Low Archaeological Sensitivity" area so the Undertaking does not anticipate effects on any significant archaeological resources due to subsurface activities. Building 006 - Mixed Use Warehouse that was evaluated by Gray & Pape to be contributing to the NAS Sunnyvale Historic District will remain. However, subsequent 1947 & 1967 additions to this building that Gray & Pape evaluated as non-contributing will be removed as part of this project.

The Undertaking will require driven piles up to a maximum depth of 65 ft to be installed to support the new structure. TEECOM has conducted a vibration assessment of the pile driving activities with respect to the historic structures (Building 005 - Water Tower, Building 006 - Mixed Use Warehouse, and Building 010 - Plant Engineering and Maintenance Shop). The assessment (Appendix J) indicates that the potential for building damage due to pile driving is low. Appropriate building criteria category have been selected based on understanding of building structures and supporting slab characteristics. The calculated PPV levels due to the nearest pile driving activity are reported for each structure based on FTA reference data. The assessment also includes consideration of empirical reference data for the bay area provided by the project contractor, which are significantly lower than the FTA reference data. As a result of this baseline data analysis regarding piling installation vibrations related to the Undertaking there will be little to no impact on the surrounding historic properties. Given the concerns around the structural integrity of these buildings, vibration monitoring of a test pile is planned to confirm local vibration propagation conditions and validate the assumptions and reference data outlined in the FTA assessment manual.

Therefore, the Undertaking would not cause an adverse effect under this criterion.

ii. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Section 68) and applicable guidelines.

The Undertaking has the potential for direct and indirect effects through visual and contextual changes that may alter the setting of the NAS Sunnyvale Historic District. However, alterations that are consistent with the Secretary of the Interior's standards for the Treatment of Historic Properties are not considered an adverse affect.

Standard 1: A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces and spatial relationships

The area of the NAS Sunnyvale Historic District where the Undertaking is proposed was historically used for utilitarian functions to support Building 001 - Hangar 1 such as water and helium storage, plant engineering, satellite testing and storage facilities. The new use of a scientific research facility with supporting labs is appropriate/will not change any distinctive materials or features of the district or its contributors. Changes to spaces and spatial relationships within the district will be minimal/not be significant because the new building is designed in a similar size, scale and shape to these utilitarian buildings and utilizes similar materials and features.

The Undertaking would not result in changes to the current use of any historic resources on Parcel 15; Building 001 - Hangar 1, Building 003 - Training & Conference Center, Building 005 - Water Tower, Building 006 - Mixed Use Warehouse, Building 010 - Plant Engineering & Maintenance, Building 045 - Small Satellite Test Facility and Building 126 - Moffett Field Historical Society will not have changes to use or any features associated with NAS Sunnyvale Historic District. The existing buildings within the APE will continue to be used as utilitarian support spaces and storage facilities. Therefore, the Undertaking adheres to Standard 1. Details on the proposed new design are elaborated upon under SOI Standard 9 & Standard 10.

Standard 2: The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided.

The Undertaking will retain and preserve the historic character of Building 005 - Water Tower on Parcel 15. The Undertaking will not touch any portion of the Water Tower and its surrounding fence but does provide a new facility that is designed and constructed adjacent to it. Distinctive materials, features, spaces and spatial relationships will be retained. Building 001, Building 003, Building 006, Building 010, Building 045, and Building 126 will be retained in place. Their spatial relationship will be altered by the introduction of the Undertaking. The Undertaking itself and its compliance to the historic character of the Historic District is explained under SOI Standard 9 and Standard 10. Therefore, the Undertaking adheres to Standard 2.

Standard 3: Each property will be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

The Undertaking will be a contemporary design that complements the buildings within the Historic District in its size/scale/height (two stories), footprint (rectangular) and shape (rectilinear). The cladding materials will differentiate it from the surrounding buildings, indicating that it is a modern laboratory building that conveys the advanced research that is being conducted within its walls. Details on the proposed new design are elaborated upon under SOI Standard 9 and Standard 10.

Standard 4: Changes to a property that have acquired historic significance in their own right will be retained and preserved.

The Undertaking in subject will not affect any characteristics of the historic properties that have acquired historic significance in their own right. The Undertaking will be located on the currently paved portion of the Parcel 15 and this pavement has not been identified as contributing to the NAS Sunnyvale Historic District. Therefore, the Undertaking adheres to Standard 4.

Standard 5: Distinctive materials, features, finishes and construction techniques or examples of craftsmanship that characterize a property will be preserved.

The Undertaking in subject will be located on the currently paved portion of the Parcel 15 where no distinct material or finishes currently exist. Building 5 - Water Tower will be preserved and featured as will the 1933 portion of Building 006 - Mixed Use Warehouse. Therefore, the Undertaking in subject adheres to Standard 5.

Standard 6: Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

The Undertaking in subject will not involve any repair, alteration or treatment of any features that belong to the historic resources (Building 005 - Water Tower, Building 006 - Mixed Use Warehouse) on Parcel 15. These resources will be maintained and protected during construction of the new building. Therefore, the Undertaking in subject adheres to Standard 6.

Standard 7: Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

The Undertaking will not involve any chemical treatment of any features that belong to the historic resources (Building 005 - Water Tower, Building 006 - Mixed Use Warehouse) on Parcel 15. Therefore, the Undertaking adheres to Standard 7.

Standard 8: Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

Based on previous archaeological investigations per the 2017 AECOM prepared NASA Ames Research Center Archaeological Resources Study, the Undertaking falls outside of any archaeologically sensitive areas. No archaeological survey of the APE appears to be warranted. However, in the event of the unanticipated discovery of archaeological features or deposits during construction activities, NASA would apply standard operating procedures for discovery situations and consistent with 36 CFR800.13 as outlined in the Integrated Cultural Resources Management Plan¹, which would halt work in the vicinity of the unanticipated discovery and engage a qualified archaeologist to evaluate the discovery and determine appropriate next steps, including consultation with the NASA FPO and the California SHPO.

¹ AECOM, "Integrated Cultural Resources Management Plan", 2014. This report suggests changing the categorization of Building 6 to eligible, however it has been evaluated since 1994.

Standard 9: New additions, exterior alterations or related new construction will not destroy historic materials, features and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

The Undertaking will include the removal of two subsequent 1947 & 1967 additions to the 1933 Building 006 - Mixed Use Warehouse on Parcel 15 as was identified under Criterion i. The main consideration for the new construction is how it will impact the character of the NAS Sunnyvale Historic District in which it is located and the contributing resources.

The design intent for the M2M Lab Building is to achieve a balance between differentiation and compatibility within the site and the Historic District (See Appendices A-F for support design documents). The project has been designed to be compatible with the architecture of the more utilitarian zone of the NAS Sunnyvale Historic District. It reflects a contemporary interpretation of these utilitarian structures.

Size and Scale - Building 010, adjacent to the project site, is a two-story stucco structure and its primary entrance is actually facing west, away from the proposed M2M Lab Building on Parcel 15. Building 001 - Hangar 1 dominates the site at over 200 ft tall and serves as the backdrop to Parcel 15 and the rest of the Historic District. The majority of the structures within the NAS Sunnyvale Historic District are two stories with the exception of Hangar 1 and the Water Tower. The M2M Lab Building has been designed to match this two-story limit to fit within the context of and be compatible with not only the adjacent structures within the APE but also those within the Historic District. This height limit also allows the Water Tower - Building 005, directly to the east of the new building on Parcel 15, to continue to be visible across that site as a tall utilitarian structure.

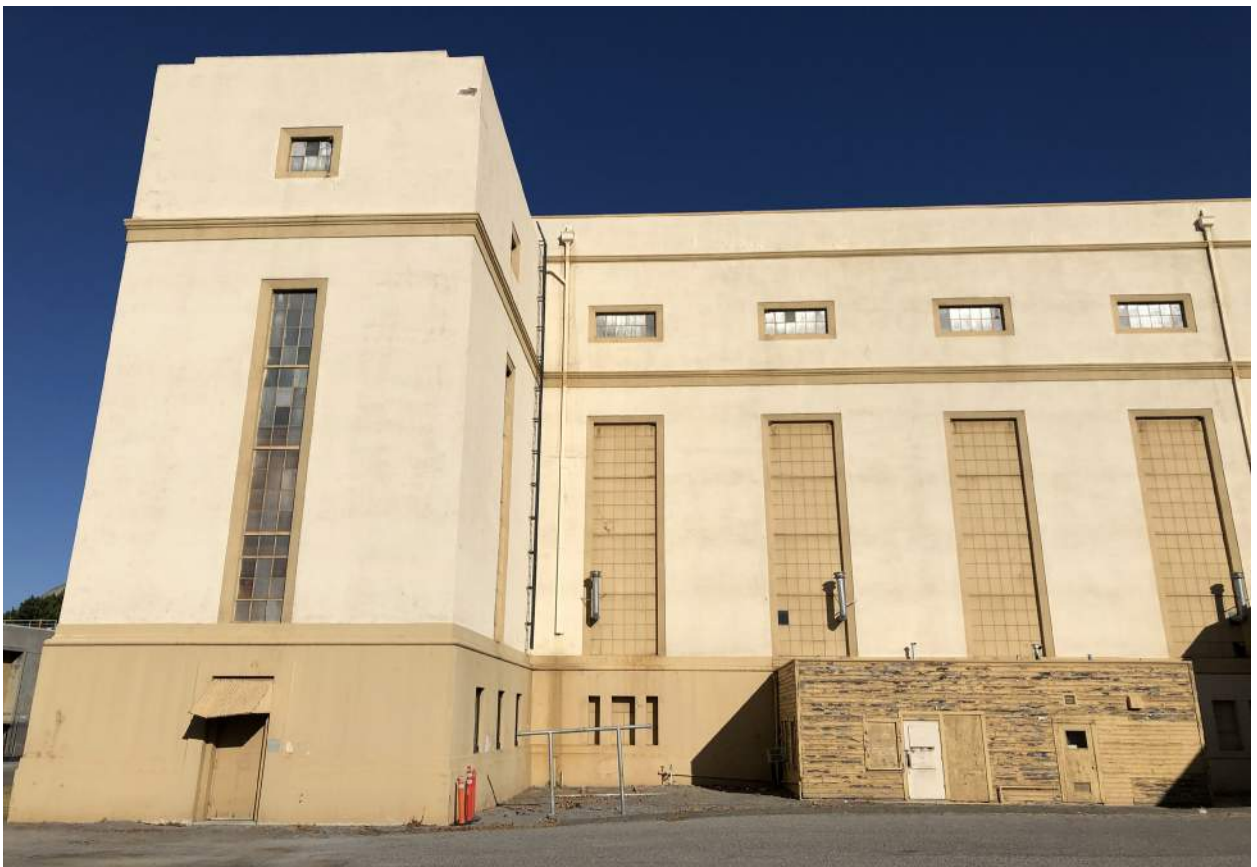


FIGURE 22: BUILDING 2 FENESTRATION

The following content was redacted from this public posting:

Page 32 with Figures 23 and 24

Roofing – A stylistic feature of the streamlined Mission/Spanish Revival style that dominates the utilitarian zone of the Historic District is a flat roof with simple parapets. The M2M Lab is designed with a flat roof. Mechanical enclosures are set back so as not to minimize visibility.

Fenestration – The streamlined Mission/Spanish Revival buildings in the utilitarian zone of the Historic District typically have punched strip windows that are either one or two stories tall and stretch vertically within their stucco exterior. Building 010 and Building 002 demonstrate this. The proposed design references these strip windows with a modern interpretation that allows for a series of two story strip windows punched into the exterior metal skin systems.



FIGURE 25: RENDERING OF M2M LAB BUILDING SOUTHWEST CORNER SHOWING ENTRANCE PLAZA AND TWO-TONED WARM COLORED METAL PANEL CLADDING. SEE APPENDIX FOR ADDITIONAL RENDERINGS.



FIGURE 26: RENDERING OF M2M LAB BUILDING NORTHEAST CORNER SHOWING DOMINANT TAN COLORED METAL PANEL COMPATIBLE WITH COLOR OF HISTORIC STUCCO AT ADJACENT BUILDINGS. SEE APPENDIX FOR ADDITIONAL RENDERINGS.



FIGURE 27: RENDERING OF M2M LAB BUILDING LOOKING NORTH ALONG DUGAN AVENUE SHOWING DOMINANT TAN COLORED METAL PANEL COMPATIBLE WITH COLOR OF HISTORIC STUCCO AT ADJACENT BUILDINGS. SEE APPENDIX FOR ADDITIONAL RENDERINGS.

Spatial Relationships – Most of the buildings within the Historic District are set back from the campus streets and boulevards, allowing for ample space for sidewalks and formal entrances to the buildings. The M2M Lab Building respects these relationships by setting the building massing back from the South Akron Rd and allowing for a generous sidewalk and entrance plaza that defines a south facing a welcoming south facing entrance. A setback is also provided along Dugan Avenue. These setbacks also allow for better spatial relationships between the new building and the existing adjacent structures. See Figure 21 for site sections that demonstrate these spatial relationships.

Landscaping – The NAS Sunnyvale Historic District is defined by formal tree lined boulevards and corresponding lush landscape plantings that help to define a campus like setting. The design for the M2M Lab Building takes this feature of the Historic District into account by introducing trees along South Akron Road along with planting areas that complement the main entrance and create a green and paved front yard for the building. This plaza will also include a rock garden to educate campus users on geology to relate the outside to the important geological research that USGS conducts inside the building.

Materials – The materials selected for the M2M Lab Building are meant to convey that it is a contemporary lab building with cutting edge research occurring within the building while at the same time respecting its neighbors in the Historic District. Two tones of exterior metal skin systems were chosen to clad the exterior. A light warm gray was chosen as a feature color to complement the warm stucco tones of the surrounding streamlined Mission/Spanish Colonial style buildings adjacent to the site (Building 010, Building 002). This light-colored paneling is accented with a warm dark gray paneling. A framed and recessed entry with accents are provided at the entrance to reference the framed and wood entrances doors that are common with the Spanish and Streamlined Mission Colonial style buildings.

Siting and Visual Impact – Some of the most significant contributing features to the NAS Sunnyvale Historic District are the views along the campus streets and boulevards. The buildings are set back from the road so that visitors can adequately take in their formal appearance and orientation when traveling on North or South Akron Road via automobile or on foot. The trees and plantings help to formalize the axial views and relationships. Hangar 1 serves as the dominating visual end focus of the formal layout of the campus. The design team paid close attention while developing the design of the M2M Lab Building so that it does not detract from these visual relationships that are so important to the unified perception of the Historic District. The siting of this building on Parcel 15 allows for it not to encroach upon or alter the landscape and roadways of the Historic District. A view corridor analysis has been implemented to ensure that this new building does not detract from the sites and views within the Historic District. Visual impact studies were taken from locations along North and South Akron Road, Cummins Rd and Cody Rd to demonstrate that this new building does not have an adverse effect visually on the Historic District or the historic structures within the APE (See Figures 26 & 27 and refer to Appendices) The new building, due to its limited two-story height and its siting on Parcel 15 at the northwest corner of the site, is not visible from most vantage points along the campus boulevards and on the more formal parts of the west campus. It also does not impede view of Hangar 1 or the Water Tower in any way thus being a compatible neighbor to these important historic structures.

Overall, the new construction will be compatible with the adjacent historic structures and the NAS Sunnyvale Historic District through the use of appropriate building siting, massing, height, setback, orientation differentiated design and materials.



FIGURE 28: LOCATION MAP INDICATING VISUAL IMPACT ANALYSIS LOCATIONS



FIGURE 29: VISUAL IMPACT ANALYSIS ALONG SOUTH AKRON ROAD - VIEW FROM WEST BEFORE



FIGURE 30: VISUAL IMPACT ANALYSIS ALONG SOUTH AKRON ROAD - VIEW FROM WEST - AFTER. EXISTING PLANTINGS AND BUILDINGS OBSCURE VIEW OF PROPOSED BUILDING (DASHED IN RED).

Standard 10: New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The project proposed is to construct a permanent facility that will not be feasibly reversible. However, as a free-standing infill building, the proposed M2M Lab Building will not impair the form or integrity of the adjacent historic building on Parcel 15, the historic buildings adjacent to Parcel 15 or the NAS Sunnyvale Historic District.

Criteria iii. Removal of the property from its historic location.

The Undertaking will involve removal of non-contributing subsequent 1947 & 1967 additions to the 1933 Building 006 - Mixed Use Warehouse from Parcel 15 thus not causing an adverse effect to this historic property under this category.

Criteria iv. Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance.

The Undertaking will not involve change of the character of the property's use. The removal of subsequent non-contributing additions to the 1933 Building 006 - Mixed Use Warehouse from Parcel 15 will not change the physical features that contribute to its historic significance within the NAS Sunnyvale Historic District thus not causing an adverse effect to this historic property under this category.

Criteria v. Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features.

The Undertaking has carefully assessed the proposed elements to ensure they do not diminish any aspect of the property's significant historic features:

Visual Assessment: A thorough visual assessment was provided as part of the Secretary of the Interior's Standards - Standard 9 evaluation above.

Atmospheric Assessment: Air quality consultants (CPP) will conduct an exhaust dispersion air quality assessment to determine acceptable exhaust and intake designs such that toxic and/or odorous materials do not reenter the planned building or impact surrounding buildings or other sensitive locations at unacceptable concentration levels. This assessment will be conducted using physical modeling in a specialized atmospheric boundary layer wind tunnel.

Audible Assessment: The design intent for the Undertaking is to ensure that the noise from the operations of the proposed facility, primarily controlled by exterior and rooftop mechanical equipment, does not negatively impact the noise environment for the historic Building 10 - Heat Plant and Building 5 - Water Tower. Appropriate criteria will be defined based on the measurement survey results and the expected occupancy, hours of operation, and noise sensitivity of the historic building use.

Criteria vi. Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization.

The Undertaking would not involve the neglect of historic properties that causes their deterioration. Therefore, the Undertaking would not cause an adverse effect to historic properties.

Criteria vii. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

The Undertaking would not involve the transfer, lease, or sale of historic properties out of Federal ownership or control and therefore would not cause an adverse effect to historic properties under this category.

6.0 CONCLUSION

The NAS Sunnyvale Historic District and Buildings 001, 003, 005, 006, 010, 045 and 126 are considered contributing buildings within that district and are the historic properties that were identified to be within the APE of the Undertaking. The criteria of adverse effect were applied to these historic properties within the APE and unanticipated archaeological historic properties that may be present in the APE. The proposed design of the Undertaking (M2M Lab Building) will minimally alter the setting of the Historic District and its contributors within the APE. The installation of driven piles based on baseline data will have little to no impact on the adjacent historic properties. This new building is sufficiently differentiated from and compatible with adjacent historic properties related to its size, profile, setbacks and massing. Proposed landscaping and site design with shade trees, plantings and entrance plaza are in keeping with the setting of adjacent historic properties within the Historic District. The proposed use of the M2M Lab Building, dedicated to geological research, is an appropriate function that complements the historic research functions of other facilities on the NASA ARC campus. The construction of the M2M Lab Building will have no impact on the integrity of location, design, materials, or workmanship of adjacent historic properties or the Historic District which is consistent with the Secretary of the Interiors Standards. While the 1933 Building 006 - Mixed Use Warehouse, a contributing feature of the Historic District, will remain as part of this project, subsequent non-contributing additions to this structure will be removed. Therefore, a finding of No Adverse Effect per CFR 800.5(b) would be appropriate for this Undertaking.

7.0 APPENDICES

APPENDIX A: SITE PLAN

APPENDIX B: ANNOTATED ELEVATIONS

APPENDIX C: SUPPORTING VISUAL EXHIBIT – RENDERINGS

APPENDIX D: SUPPORTING VISUAL EXHIBIT – VISUAL IMPACT ANALYSIS

APPENDIX E: SUPPORTING VISUAL EXHIBIT - EXISTING FEATURES AND MATERIALS IN NAS SUNNYVALE HISTORIC DISTRICT

APPENDIX F: CIVIL SITE PLAN

APPENDIX G: SELECT HISTORIC PHOTOS

APPENDIX H: GRAY & PAPE CULTURAL RESOURCES ASSESSMENT LETTER REPORT

APPENDIX I: TEECOM PILE DRIVING VIBRATION IMPACT ASSESSMENT

APPENDIX J: GRAY & PAPE PRIMARY RECORD FORM FOR BUILDING 006

APPENDIX A: SITE PLAN

The following content was redacted from this public posting:

Appendix A

Page 41with Figure A-1: M2M Building Site Plan

APPENDIX B: ANNOTATED ELEVATIONS

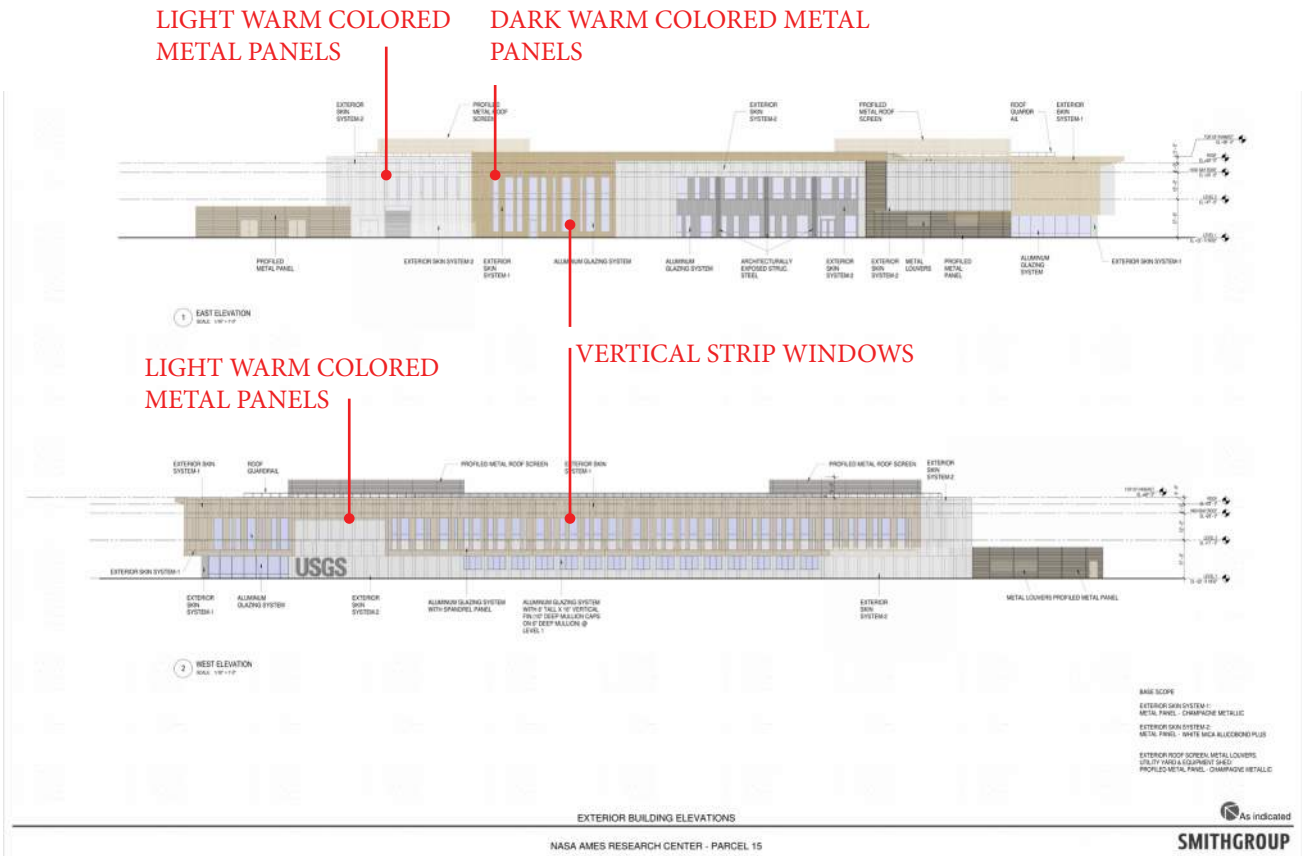


FIGURE B-1: EAST & WEST ELEVATIONS

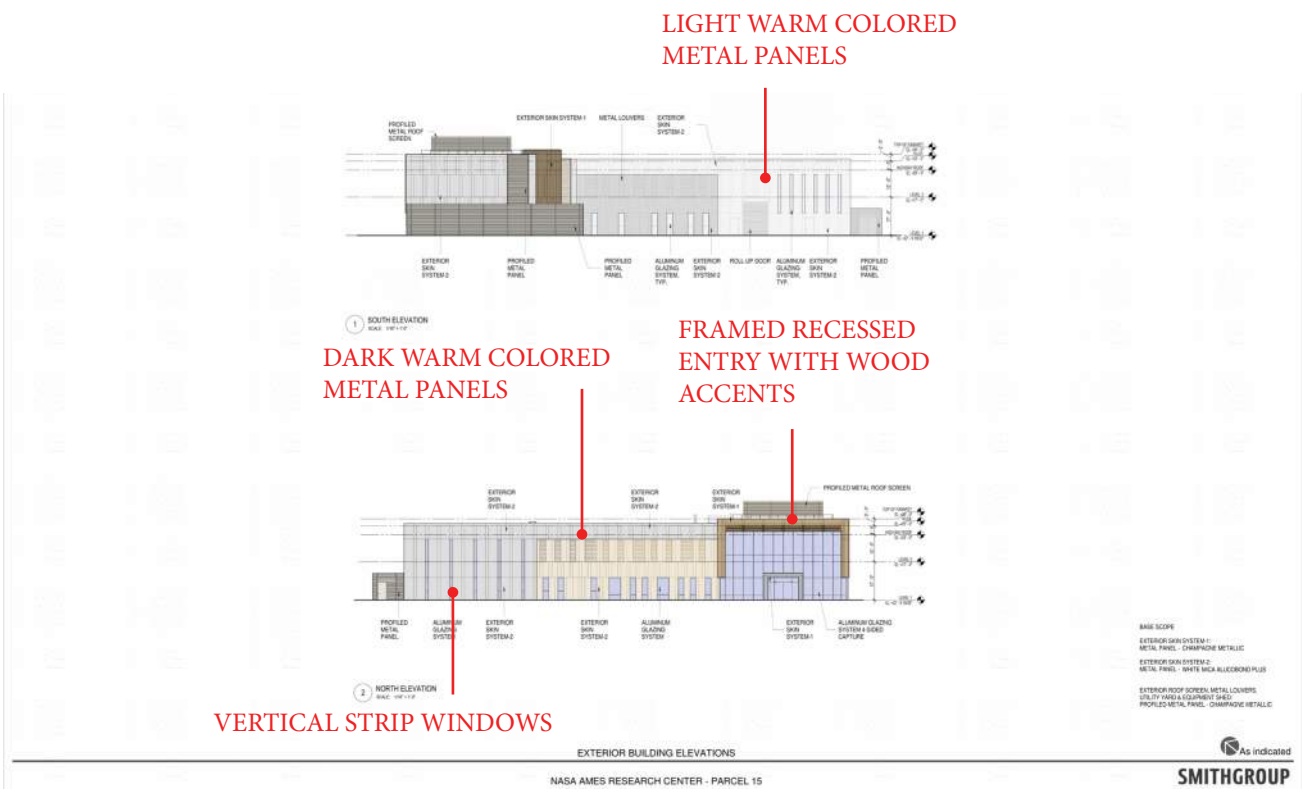


FIGURE B-2: NORTH & SOUTH ELEVATIONS

APPENDIX C: SUPPORTING VISUAL EXHIBIT – RENDERINGS



FIGURE C-1: RENDERING 1 - M2M LAB BUILDING - VIEW OF SOUTHWEST CORNER SHOWING TWO TONED METAL CLADDING WITH WARM TAN COLOR COMPATIBLE WITH ADJACENT HISTORIC STUCCO. ALSO SHOWING RECESSED ENTRY PORTAL AND ENTRANCE PLAZA.



FIGURE C-2: RENDERING 2 - M2M LAB BUILDING - VIEW OF NORTHEAST CORNER SHOWING TWO TONED METAL CLADDING WITH WARM TAN COLOR COMPATIBLE WITH ADJACENT HISTORIC STUCCO. ALSO SHOWING RELATIONSHIP TO EXISTING HISTORIC WATER TOWER.



FIGURE C-3: RENDERING 3 - M2M LAB BUILDING - VIEW LOOKING NORTH ALONG DUGAN AVENUE SHOWING TWO TONED METAL CLADDING WITH WARM TAN COLOR COMPATIBLE WITH ADJACENT HISTORIC STUCCO.



FIGURE C-4: RENDERING 4 - M2M LAB BUILDING - VIEW LOOKING SOUTH ALONG DUGAN AVENUE SHOWING TWO TONED METAL CLADDING WITH WARM TAN COLOR COMPATIBLE WITH ADJACENT HISTORIC STUCCO.

APPENDIX D: SUPPORTING VISUAL EXHIBIT – VISUAL IMPACT ANALYSIS



FIGURE D-1: KEY MAP OF VIEW IMPACT ANALYSIS LOCATIONS



FIGURE D-2: VIEW 1 - BEFORE - FROM SOUTH AKRON ROAD AT PARADE GROUND LOOKING EAST



FIGURE D-3: VIEW 1 - AFTER - SHOWING OUTLINE OF M2M LAB BUILDING AS IT IS OBSCURED BY PLANTINGS AND OTHER BUILDINGS



FIGURE D-4: VIEW 2- BEFORE - SOUTH AKRON ROAD-SIDEWALK-LOOKING EAST



FIGURE D-5: VIEW 2 - AFTER - SHOWING OUTLINE OF M2M LAB BUILDING AS IT IS OBSCURED FROM SIGHT BY EXISTING BUILDINGS



FIGURE D-6: VIEW 3 - BEFORE - FROM SIDEWALK APPROACHING MC CORD AVE



FIGURE D-7: VIEW 3 AFTER - SHOWING OUTLINE OF M2M LAB BUILDING IS MOSTLY OBSCURED FROM SIGHT BY EXISTING BUILDING



FIGURE D-8: VIEW 4 - BEFORE - FROM BLDG 10 PLAZA



FIGURE D-9: VIEW 4 - AFTER - ONLY A SMALL PORTION OF M2M LAB BUILDING VISIBLE BETWEEN TWO EXISTING BUILDINGS



FIGURE D-9: VIEW 5 -BEFORE - VIEW FROM N AKRON RD & MC CORD AVE



FIGURE D-10: VIEW 5 -AFTER - M2M LAB BUILDING ENTRY PORTAL VISIBLE WITH THE REMAINDER OF THE BUILDING OBSCURED BY TREES AND EXISTING BUILDINGS.



FIGURE D-11: VIEW 6 -BEFORE - VIEW FROM CODY RD LOOKING NORTH



FIGURE D-12: VIEW 6 - AFTER - M2M LAB BUILDING SHOWN IN OUTLINE AS IT IS OBSCURED BY EXISTING BUILDING



FIGURE D-13: VIEW 7 - BEFORE - VIEW FROM CODY RD LOOKING NORTH



FIGURE D-14: VIEW 7 - AFTER - M2M LAB BUILDING PARTIALLY OBSCURED BY EXISTING BUILDINGS



FIGURE D-15: VIEW 8 - BEFORE - VIEW FROM CODY RD LOOKING NORTH



FIGURE D-16: VIEW 8 - M2M LAB BUILDING WITH OUTLINE WHERE IT IS PARTIALLY OBSCURED



FIGURE D-17: VIEW 9 - BEFORE - VIEW FROM CODY & WESTCOAT RD



FIGURE D-18: VIEW 9 - AFTER - M2M LAB BUILDING ALMOST FULLY OBSCURED BY EXISTING BUILDINGS



FIGURE D-19: VIEW 10 - BEFORE - VIEW FROM CUMMINS AVE



FIGURE D-20: VIEW 10 - M2M LAB BUILDING WITH OUTLINE SHOWING BUILDING MOSTLY OBSCURED BY EXISTING BUILDING



FIGURE D-21: VIEW 11 - BEFORE - VIEW FROM CUMMINS AVE & N AKRON RD



FIGURE D-22: VIEW 11 -AFTER - TWO THIRDS OF M2M LAB BUILDING VISIBLE



FIGURE D-23: VIEW 12 -BEFORE - VIEW FROM SEVERYNS AVE



FIGURE D-24: VIEW 12 - AFTER - M2M LAB BUILDING OUTLINED AS IT IS COMPLETELY OBSCURED BY TREES AND EXISTING BUILDINGS



FIGURE D-25: VIEW 13 - BEFORE - VIEW FROM COMMISSARY BLDG ENTRANCE



FIGURE D-26: VIEW 13 - AFTER - M2M LAB BUILDING OUTLINED AS IT IS ALMOST COMPLETELY OBSCURED BY EXISTING BUILDING

APPENDIX E: SUPPORTING VISUAL EXHIBIT – EXISTING FEATURES AND MATERIALS IN NAS SUNNYVALE HISTORIC DISTRICT



FIGURE E-1: HISTORIC DISTRICT UTILITARIAN ZONE MISSION REVIVAL FEATURES AND MATERIALS



FIGURE E-2: HISTORIC DISTRICT UTILITARIAN ZONE MISSION REVIVAL FEATURES AND MATERIALS

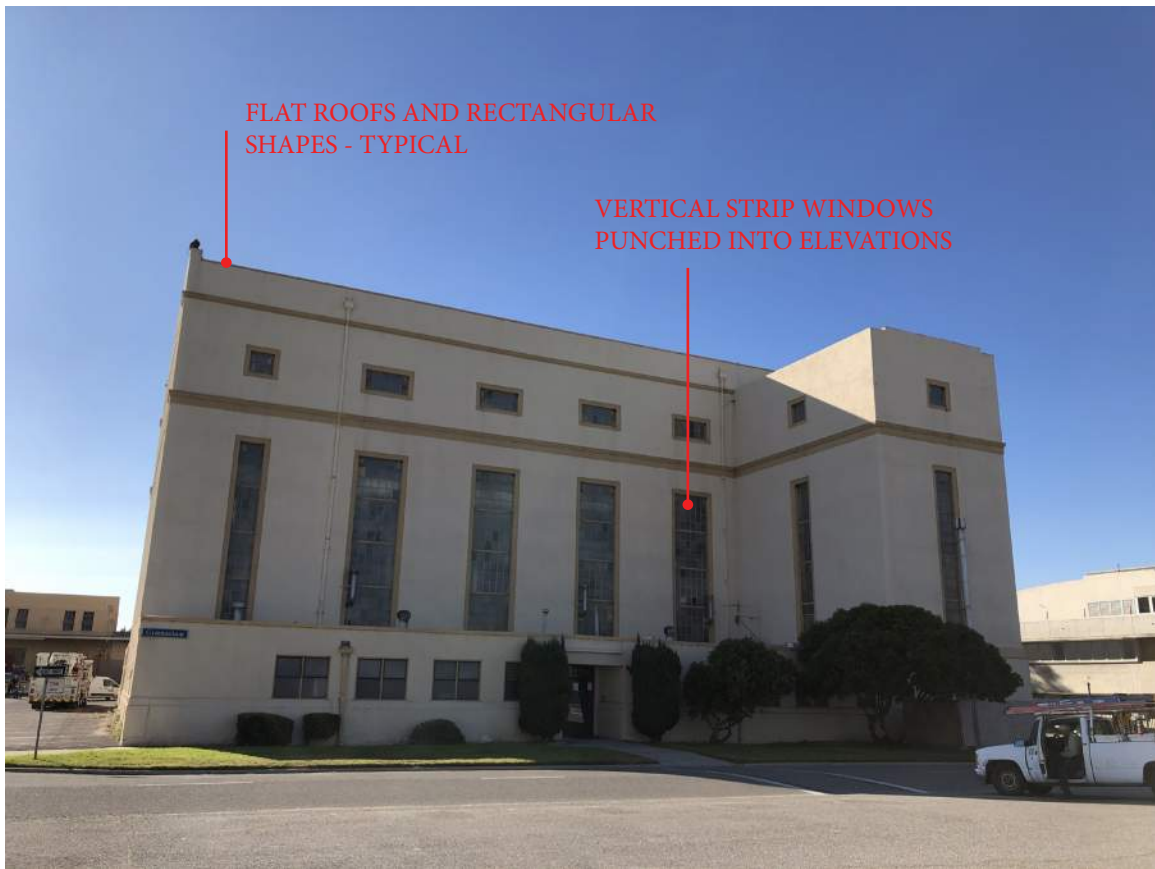


FIGURE E-3: HISTORIC DISTRICT UTILITARIAN ZONE MISSION REVIVAL FEATURES AND MAATERIALS



FIGURE E-4: HISTORIC DISTRICT UTILITARIAN ZONE MISSION REVIVAL FEATURES AND MATERIALS

APPENDIX F: CIVIL SITE PLAN

The following content was redacted from this public posting:

Appendix F
Page 65 with Figure F-1: Civil Site Plan

APPENDIX G: SELECT HISTORIC PHOTOS



FIGURE H-1: HISTORIC PHOTO CIRCA 1933



FIGURE H-2: HISTORIC PHOTO CIRCA 1943



FIGURE H-3: HISTORIC PHOTO CIRCA 1948



FIGURE H-4: HISTORIC PHOTO CIRCA 1993

APPENDIX H: GRAY & PAPE CULTURAL RESOURCES ASSESSMENT LETTER REPORT



GRAY & PAPE
HERITAGE MANAGEMENT

Since 1987

7508 Ridge Road
Frederick, MD 21702
301.525.6631

April 5, 2021

Johnny Wong, Principal
SmithGroup
301 Battery Street
San Francisco, CA 94111

RE: Revised Section 106 Cultural Resources Assessment in Support of the Proposed United States Geological Survey M2M Lab Building within the NASA Ames Research Center, Sunnyvale, California

Dear Mr. Wong:

At your request, Gray & Pape, Inc. (Gray & Pape) has reviewed SmithGroup's December 16, 2020 report entitled *U.S. Geological Survey M2M Lab Building NASA Ames Research Center Parcel 15 Section 106 Technical Report* and offers the following assessment of cultural resources located in the project area. Gray & Pape understands that SmithGroup intends to consider these findings in preparing a revised submittal in response to input received from the National Aeronautics and Space Administration (NASA) Ames Research Center (ARC) personnel. This letter supplements suggested responses to comments and report edits provided by Gray & Pape to SmithGroup via email on February 17 and 18, 2021.

Professional Qualifications

The archaeological resource assessment was performed by Christopher Polglase, M.A., a Registered Professional Archaeologist with over 35 years of technical experience in the field who meets the Secretary of the Interior's (SOI) Professional Qualification Standards in Archaeology (36 CFR Part 61). The aboveground resource assessment was performed by Carrie Albee, M.A., who meets the SOI Professional Qualification Standards in Architectural History and has 24 years of technical experience in the field.

Archaeological Assessment

This archaeological assessment addresses NASA ARC's request for such an analysis prepared by a SOI-qualified archaeologist. The assessment is based upon a review of technical studies prepared for NASA ARC by AECOM during the past decade, including an archaeological resources study (dated February 2017) and an Integrated Cultural Resources Management Plan (ICRMP) (dated November 2014).

The *NASA Ames Research Center Archaeological Resources Study* was prepared by AECOM to provide guidance for archaeological resources management and project planning at ARC in support of NASA's obligations under the National Historic Preservation Act of 1966 (NHPA) and other federal mandates.¹ The study identified the potential for archaeological resources at ARC through a review of prior surveys, previously recorded resources, historic maps, Sacred Land Files from the Native American Heritage Commission, and geotechnical investigations conducted at NASA ARC.

The AECOM study found that there are relatively few recorded archaeological sites within ARC and the potential for National Register of Historic Places (NRHP)-eligible resources is somewhat limited, due to

¹ AECOM, "NASA Ames Research Center: Archaeological Resources Study," February 2017.

the development of the site by the U.S. Navy and NASA during the twentieth century. The data reviewed by AECOM allowed their team to prepare a series of maps that illustrate areas of anticipated archaeological sensitivity. The AECOM study identified four tiers of archaeological sensitivity:

- **Heightened Historic-Era Archaeological Sensitivity:** This map illustrates generalized areas of heightened historic archaeological sensitivity based on the map-projected locations of historic farmsteads and other structures prior to 1931. These areas of sensitivity are focused primarily on farmsteads and/or mapped structures from the mid-nineteenth century to the first decade of the twentieth century.
- **Heightened Prehistoric-Era Archaeological Sensitivity:** This map illustrates generalized areas of heightened prehistoric archaeological sensitivity. Areas that the AECOM team believe are most likely to contain prehistoric materials that existed prior to the development of the facility and where intact deposits or features might have survived the construction activities on the site.
- **Heightened Geoarchaeological Sensitivity:** This map illustrates generalized areas of heightened prehistoric archaeological sensitivity that the AECOM team believe are most likely to contain minimally disturbed buried prehistoric materials.
- **Low Archaeological Sensitivity:** Areas within NASA ARC that were not designated within the previous categories were determined to have a low potential for containing archaeological resources.

The study received concurrence from the California State Historic Preservation Office (SHPO) on June 22, 2017 as a baseline study for archaeological planning.

The site of the current Undertaking (i.e., proposed project) has not been subject to a previous archaeological survey.² However, according to AECOM's analyses and as presented in Figure 16 of their report, the Undertaking is located in an area of Low Archaeological Sensitivity. The closest area of Heightened Prehistoric-Era Archaeological Sensitivity to Parcel 15 is located approximately 250 meters to the east, on the opposite side of Hanger 1 (Building 001). The closest area of Heightened Historic-Era Archaeological Sensitivity to Parcel 15 is located on the opposite side of Wescoat Road from Parcel. This area of Heightened Historic-Era Sensitivity reflects the map-projected location of one of a handful of widely scattered structure(s) illustrated in the 1876 Thompson and West Atlas and possibly on the 1897 USCGS Mountain View and Alviso T-Sheet. It should be noted that this area of archaeological sensitivity incorporates a 250-foot buffer from the actual map-projected location.

Based on the fact that the historic maps illustrate land use in the nineteenth century characterized by dispersed, widely scattered farmsteads, and given the anticipated large-scale earthmoving activities that would have been associated with construction of U.S. Naval Air Station (NAS), Sunnyvale, California during the 1930s, it is reasonable to expect that few features or deposits associated with a mid-to-late nineteenth farmstead would have survived within Parcel 15, if any features or deposits were once present. The prior development of Parcel 15 almost certainly would have significantly impacted prehistoric features or deposits that might have been located here prior to construction of NAS Sunnyvale. AECOM's characterization of the area around Parcel 15 as having low potential for containing significant archaeological resources is supported by our review of the available data.

Section 106 of the NHPA required Federal agencies to consider the effects of their undertakings on historic properties, which are specifically defined as those that are listed in or eligible for listing in the

² AECOM, "NASA Ames Research Center: Archaeological Resources Study," February 2017, Figure 7.

NRHP. It is unlikely that the APE contains archaeological historic properties, and an archaeological survey does not appear to be warranted.

Aboveground Resource Assessment

Twelve (12) individual properties and one district are located within the APE for the proposed Project. All of the properties have been evaluated for listing in the NRHP as part of one or more of the following built resource studies, described in more detail in the NASA ARC ICRMP:

- *National Register of Places District Nomination: US Naval Air Station Moffett Field* (Urban Programmers, 1991), which resulted in the listing of the U.S. NAS Sunnyvale Historic District under Criteria A and C in 1994;
- *Final Inventory and Evaluation of Cold War Era Historical Resources, Moffett Federal Airfield and NASA Crows Landing Flight Facility* (SAIC, 1999), which determined 148 resources to be ineligible for listing;
- *Hangar 1, Moffett Field Naval Air Station*, Historic American Engineering Record (HAER) #CA-335 (Page & Turnbull, 2006); and
- *Historic Property Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California* (AECOM, 2013), which recommended expansion of the NAS Sunnyvale Historic District to include the airfield.

While several other built resource studies have been conducted at ARC, they did not address the properties within the Area of Potential Effects (APE) for the Undertaking. To date, no comprehensive gate-to-gate survey and NRHP evaluation of built resources at Ames has been conducted.

No field survey or original research was performed by the Gray & Pape in preparing this assessment. However, review of readily available information on the properties provided sufficient information to enable a good-faith preliminary identification of known and potential aboveground historic properties located within the APE. A brief summary of those findings is presented below.

U.S. NAS Sunnyvale, California Historic District (1930-1961)

Recommendation: *Eligible per AECOM 2013*

The U.S. NAS Sunnyvale, California Historic District (NRIS Reference No. 94000045) was listed in the NRHP in 1994 for its association with the expanding defense capabilities of the U.S. Navy, the engineering technology found in lighter than air ships, the design of the hangar and system for porting the dirigible and in the plan and architectural style of the station designed to support this defense technology. The district was found to possess national significance under Criteria A and C in the areas of Military and Engineering, with two periods of significance from 1930-1935 and 1942-1946. In 2013, AECOM conducted a survey and NRHP evaluation of the airfield at Ames and recommended that the NRHP-listed historic district should be expanded to include the airfield, and the period of significance extended from 1930-1961.

For the purposes of this Section 106 submission, Gray & Pape recommends that the U.S. NAS Sunnyvale, California Historic District be defined as presented in the 2013 AECOM report.

Building 001 – Hangar One (1933)

Recommendation: *Individually eligible, contributing to district*

Hangar One has been extensively researched and recorded over the past 30 years for its engineering significance and for its role in housing the Naval airship U.S.S. MACON dirigible. According to the HAER documentation it has been determined individually eligible for listing in the NRHP and it is a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Gray & Pape concurs with these determinations and recommends that for the purposes of this Section 106 submission, Hangar One be treated as individually eligible and a contributing resource to the identified historic district.

Building 003 – Training & Conference Center (1933)

Recommendation: *Contributing to district*

In a 1933 landscape plan for the NAS Sunnyvale, the building shown in this location is identified as a café. Later it became the officers club. The existing building on the site, constructed in 1933, exhibits the design characteristics of a Spanish Mission-style hacienda, although it is clear from looking at the building in its current condition, and historic aerial imagery, that it has been expanded from its original configuration. The 1991 NRHP nomination form for the historic district identifies Building 003 as non-contributing due to lack of integrity. There is no indication from data available to Gray & Pape that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape, Building 003 is understood to have performed an integral function to NAS Sunnyvale. While the resource exhibits substantial alteration from its original 1933 configuration, it is not clear to what extent the alterations may or may not fall within the expanded period of significance for the historic district. Photographic sources suggest that the building retains enough of its character-defining features to convey its historic use and to contribute to the historic district.

As an individual resource, it is not likely that Building 003 would be NRHP eligible. As a Spanish Mission Revival-style building, it is typical of military installations of the period and it is not known to be an outstanding or well-preserved example of the style. Its known functions since its construction – café, officers' club, conference center – are commonplace support functions within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 003 be treated as a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 005 – Water Tower & Storage (1932)

Recommendation: *Contributing to district*

Building 005 is the original water tower for the NAS Sunnyvale. Now abandoned in place, the tower is a readily-identifiable and distinctive feature from the first period of construction at Ames that appears to have been little changed since then. The 1991 NRHP nomination form for the historic district identifies Building 005 as a contributing resource. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape, Building 005 performed an integral albeit utilitarian function within the NAS Sunnyvale. As an individual resource, it is visually and functionally commonplace to military installations of the period and is not expected to possess significance independently of the historic district.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 005 be treated as a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 006 – Mixed Use Warehouse (1933)

Recommendation: *Contributing to district*

In a 1933 landscape plan for the NAS Sunnyvale, Building 006 is identified as “Motor Test Building.” Its proximity to Hangar One suggests that the function directly supported the operation of the U.S.S. MACON dirigible, which was powered by eight German-made Maybach VL II 12-cylinder, 560 hp (418 kW) gasoline-powered engines that drove outside propellers. Later functions include recycling and storage. As originally designed and built, Building 006 was a boxy, windowless, utilitarian building with only the buff-colored stucco exterior to link it visually to the Spanish Mission-style campus. In its current condition, the original square-plan building incorporates utilitarian extensions projecting from the northwest and southwest elevations that date from after World War II. The 1991 NRHP nomination form for the historic district identifies Building 006 as non-contributing, due to lack of integrity.³ There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape, Building 006 is understood to have performed an integral function to the NAS Sunnyvale during the short period of operation of the U.S.S. MACON. While the resource exhibits substantial alteration from its original 1933 configuration, it is not clear to what extent the alterations may or may not fall within the expanded period of significance for the historic district. Photographic sources show that the original portion of the building is identifiable and intact, suggesting that the core of the building retains enough of its character-defining features to contribute to the historic district.

As an individual resource, it is not likely that Building 006 would be NRHP eligible individually, as it is a utilitarian support building with no known significant design or engineering aspects. Its function as recycling and storage in recent years further suggests a lack of individual significance, as these are commonplace support functions within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 006 be treated as a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 010 – Plant Engineering & Maintenance Shop (1932)

Recommendation: *Contributing to district*

Building 010 is the original helium and boiler plant for NAS Sunnyvale, and as such has a direct relationship to the operation of the U.S.S. MACON. Documentary photographs show that the plant was immediately adjacent to helium storage structures and a natural gasholder, suggesting that the plant drew in natural gas from the gasholder, extracted the helium, and stored it until it was pumped to Hangar One via underground tunnels. After the termination of the Navy lighter-than-air program, it appears that the building retained its more typical function as a heating plant for the installation. Subsequent uses include maintenance shop and storage. The building incorporates Spanish Mission-style design elements and with the exception of the smokestack, which is no longer extant, has been little altered since its original construction. The 1991 NRHP nomination form for the historic district identifies Building 010 as a

³ Note that in the version of the NRHP nomination linked on ARC’s website, Building 006 is identified as contributing. The reason for the discrepancy is unclear.

contributing resource. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

Based upon the limited information available to Gray & Pape, Building 010 originally performed an important role in the operation of the U.S.S. MACON, and thereafter had an integral albeit utilitarian function as a heat plant within NAS Sunnyvale. As an individual resource, the plant is not expected to possess significance independently of the historic district. The Spanish Mission style is widespread in the region, nor is it known to be unique among heat plants at military installations of the period. Possible individual eligibility as a helium plant has been considered, but given that this function terminated by the 1940s, it is unlikely that the interior retains the equipment or configuration necessary to convey that significance.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 010 be treated as a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 010A – Chemical Feed & Storage for Bldg. 010 Boiler (1996)

Recommendation: *Non-contributing to district*

Building 010A is a very small utilitarian support structure located immediately adjacent to Building 010. While functionally it supports Building 010, a contributing resource to the historic district, its date of construction is well outside of the period of significance. There is no indication that Building 010A has ever been evaluated for NRHP eligibility under any context.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 010A be treated as a non-contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 045 – Small Satellite Test Facility (1944)

Recommendation: *Contributing to district*

No information on the original function or history of this building was found during this study. According to NASA's records it was built in 1944, and this is supported by documentary photographs from the period. In the 2000s the resource was described as the Public Works Paint Shop. The 1991 NRHP nomination form for the historic district identifies Building 045 as a non-contributing resource, but no reason is provided. The building is not explicitly addressed in AECOM's proposed historic district expansion, as the resource was outside of the airfield study area. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that potential eligibility under other contexts has ever been evaluated.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 045 be treated as a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 126 – Moffett Field Historical Society (1949)

Recommendation: *Contributing to district*

The Cold War study, completed in 1999, describes Building 126 as "three pre-fabricated metal gable-roofed interconnected buildings set on a concrete foundation." It indicates that the building was originally used as a warehouse, and later as a railroad museum and storage. The study evaluated the NRHP eligibility of Building 126 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

The 1991 NRHP nomination form for the historic district identifies Building 126 as a non-contributing resource, presumably because it was constructed outside the period of significance. The building is not

explicitly addressed in AECOM's proposed historic district expansion, as the resource was outside of the airfield study area. There is no indication that the contributing status of the resource has been reconsidered since 1991, nor that the potential eligibility under contexts other than the Cold War has ever been evaluated.

Recent photographs show that Building 126 is typical of semi-permanent military construction of the 1940s, and that it retains integrity to that period. As such, the building is not likely to possess historical significance individually under Criterion C. Nor is the building known to have supported a significant function that would merit consideration outside of the historic district.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 126 be treated as a contributing resource to the U.S. NAS Sunnyvale, California Historic District.

Building 503 – Partners Manufacturing & Prototype Facility (1966)

Recommendation: *Not Eligible*

The Cold War study indicates that at that time Building 503 was functioning as the Navy Exchange Service Station. Designed as a gas station by Rudolph & Sheeten and completed in 1966, the building, while utilitarian, reflects the influence of mid-twentieth-century stripped down Modernism, typical of Federal construction of the period. The study evaluated the NRHP eligibility of Building 503 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989). Building 503 is outside of the original and expanded boundaries of the U.S. NAS Sunnyvale, California Historic District, and as such was not addressed in the 1991 or 2013 district studies. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

Little information on Building 503 was available for this preliminary evaluation, nor were current photographs of the resource and its context reviewed. NASA real property records indicate that while identified as a single asset, Building 503 consists of one large building and several ancillary buildings and/or structures of unknown construction date. It is not clear if the ancillary resources predate the current use of the facility (i.e., Partners Manufacturing & Prototype Facility). Based upon information contained in the Cold War study resource form, Building 503 was a typical fueling station on a military installation, and as such is not likely to be individual eligible for listing in the NRHP.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 503 be treated as individually ineligible for listing in the NRHP.

Building 510 – Administrative Building (1967)

Recommendation: *Non-contributing to district; Not Individually Eligible*

Building 510 occupies the former location of helium storage structures that originally supported the helium plant (Building 010). As the Navy's lighter-than-air program terminated in the 1940s, it is likely that the helium storage structures were demolished, and the site remained vacant until the construction of Building 510 in 1967. The Cold War study describes Building 510 as "two interconnected pre-fabricated ribbed metal buildings with medium-pitched gable roofs." It indicates that the building's original use is unknown and at the time served as a NASA maintenance office. The study evaluated the NRHP eligibility of Building 510 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

Building 510 is outside of the original and expanded periods of significance of the U.S. NAS Sunnyvale, California Historic District, and as such would not contribute to the district. There is no

indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

As an individual resource, it is not likely that Building 510 would be NRHP eligible individually, as it is a utilitarian support building with no known significance. Its function as maintenance and administrative office space in recent years further suggests a lack of individual significance, as these are commonplace support functions within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 510 be treated as a non-contributing resource to the U.S. NAS Sunnyvale, California Historic District, and individually ineligible for listing in the NRHP.

Building 567 – Facilities Maintenance Warehouse (1978)

Recommendation: Non-contributing to district; Not Individually Eligible

Located immediately adjacent to the former helium plant (Building 010), Building 567 occupies a space originally planned for helium storage, but documentary photographs indicate that the land remained vacant until the 1950s. It appears that Building 567 replaced this earlier 1950s building, whose function is unknown. The Cold War study describes Building 567 as “a pre-fabricated ribbed metal building with a shallow-pitched metal roof,” that originally served as a warehouse and was at the time being used as a public works warehouse. The study evaluated the NRHP eligibility of Building 567 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

Building 567 is outside of the original and expanded periods of significance of the U.S. NAS Sunnyvale, California Historic District, and as such would not contribute to the district. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

As an individual resource, it is not likely that Building 567 would be NRHP eligible individually, as it is a utilitarian support building with no known significance. Pre-fabricated metal warehouses like this one are commonplace within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 567 be treated as a non-contributing resource to the U.S. NAS Sunnyvale, California Historic District, and individually ineligible for listing in the NRHP.

Building 570 – Maintenance Storage (JCM) (1996)

Recommendation: Non-contributing to district; Not Individually Eligible

Building 570 is a very small utilitarian support structure located immediately adjacent to Building 010. The Cold War study describes Building 570 as “a square flat-roofed building covered with metal panels” constructed in 1978 and at the time used as maintenance storage. The study evaluated the NRHP eligibility of Building 570 under Criteria Consideration G, only, and determined the resource to be ineligible under the Cold War context (1946-1989).

Building 570 is outside of the original and expanded periods of significance of the U.S. NAS Sunnyvale, California Historic District, and as such would not contribute to the district. There is no indication that the potential eligibility of the resource under contexts other than the Cold War has ever been evaluated.

As an individual resource, it is not likely that Building 570 would be NRHP eligible individually, as it is a utilitarian support building with no known significance. Pre-fabricated metal storage sheds like this one are commonplace within the context of military, and subsequently NASA, operations.

For the purposes of this Section 106 submission, Gray & Pape recommends that Building 570 be treated as a non-contributing resource to the U.S. NAS Sunnyvale, California Historic District, and individually ineligible for listing in the NRHP.

Conclusion

Gray & Pape's research herein was designed to address questions related to the archaeological sensitivity of Parcel 15 and the potential NRHP eligibility of built resources within the project's APE. The assessment provides assessments completed by SOI-qualified professionals. We understand that SmithGroup will incorporate these findings in an updated Section 106 report for the proposed USGS M2M Lab Building within NASA ARC.

We trust that these assessments are responsive to your needs at this time. If you should have any questions or need additional information, please do not hesitate to contact Christopher Polglase at +1 301 525 6631 (mobile), or cpolglase@graypape.com.

Best regards,



Christopher R. Polglase, M.A., RPA
Cultural Heritage Practice Leader

APPENDIX I: TEECOM PILE DRIVING VIBRATION IMPACT ASSESSMENT

USGS - Research Facility Parcel 15 NASA Ames Research Center Pile Driving Vibration Impact Assessment



To: Johnny Wong, Smithgroup
Robert Wu, Smithgroup

June 11, 2021

William Rosentel
william.rosentel@teecom.com

Peter Holst
peter.holst@teecom.com

Summary

TEECOM has assessed the potential for building damage of historic structures in the vicinity of the proposed research facility at Parcel 15 of the NASA Ames Research Center per the methods outlined in the FTA Transit Noise and Vibration Impact Assessment Manual.

The results of the assessment indicate that the potential for building damage due to pile driving is low. Typical impact pile driving vibration levels at the neighboring buildings will not exceed the limits established by the FTA for reinforced-concrete, steel, or timber structures (Category I). However, maximum (peak particle velocity) vibration levels are calculated to marginally exceed the vibration limits at the nearest receiver, Building 10. These results are based on the "FTA reference" levels for impact pile driving and assume normal propagation conditions.

Contractor-provided "Empirical reference" data for pile driving activities are included in the assessment and indicate that vibration levels due to impact pile driving within the bay area are significantly lower than the FTA reference levels. However, FTA reference levels are the primary basis for this analysis as the empirical reference data was provided without supporting documentation such as date, location, procedure, or background information.

Groundborne vibration propagation varies greatly in the Bay Area due to local soil conditions. Given the concern around vibrations and the borderline results of this assessment, a strategic location should be selected for the planned pilot test pile, with simultaneous vibration measurement performed to verify that the limits are not exceeded or if additional vibration mitigation measures and/or continuous monitoring are necessary.

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USGS - Research Facility Parcel 15 NASA Ames Research Center Pile Driving Vibration Impact Assessment



To: Johnny Wong, Smithgroup
Robert Wu, Smithgroup

June 11, 2021

William Rosentel
william.rosentel@teecom.com

Peter Holst
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Summary

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Appendix I

Page 2 with Figure 1: Overall Site Plan Layout and Receiver Locations

2. Vibration Impact Criteria

Appropriate vibration impact criteria for assessing human annoyance and interference with vibration sensitive equipment are determined based on sensitivity of the land use, frequency, and time of events. Vibration impact criteria for assessing building damage are based on construction type and age (fragility) of the structure. Guidelines for appropriate vibration levels are provided in Sections 6.2 and 7.2 of the FTA Transit Noise and Vibration Impact Assessment Manual for human annoyance and building damage, respectively.

2.1 Criteria for Building Damage

Criteria for assessment of building damage due to ground-borne vibration levels are divided into four building/structural categories; the table below (Table 7-5 Construction Vibration Damage Criteria) outlines each of the category descriptions with criteria in terms of maximum peak particle vibration velocities as well as RMS² vibration decibels (VdB³ re: 1 µin/s determined from PPV limits using a crest factor⁴ of four).

Building / Structural Category	Criteria (Max PPV, in/s)	Criteria (Approx. VdB)
I. Reinforced-concrete, steel, or timber (no plaster)	0.500	102
II. Engineered concrete and masonry (no plaster)	0.300	98
III. Non-engineered timber and masonry buildings	0.200	94
IV. Buildings extremely susceptible to vibration damage	0.120	90

Table 1 - [Construction Vibration Damage Criteria \(Table 7-5\)](#)

It is understood that the structural integrity of each of the three structures under consideration are not compromised and do not contain plaster. Buildings 6 and 10 are assumed to be steel and/or reinforced concrete superstructures on concrete foundations. An observational evaluation by a structural engineer is recommended to confirm this understanding. The Water Tower is understood to be a steel structure on a concrete foundation. Therefore, Category I is determined to apply to all three structures and the corresponding criteria is used to assess the potential for building damage due to proposed pile driving activities.

2.2 Criteria for Occupant annoyance

Vibration criteria for occupant annoyance and vibration sensitive equipment are based on land use and event frequency and are much lower than building damage criteria (65 VdB to 75 VdB as compared to 90 VdB to 102 VdB). We understand each of the buildings under consideration [are](#) not regularly occupied and will be mostly vacant during construction. Additionally, these buildings do not house any particularly vibration-sensitive equipment or activities.

Based on these considerations and the proximity of the structures to the proposed building, no further analysis for occupant annoyance is expected to be necessary related to the pile driving site work.

² RMS - Root-Mean-Square

³ VdB - Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second.

⁴ Crest Factor - The ratio of peak particle velocity to maximum RMS amplitude in an oscillating signal.

3. Pile Driving Vibration Source Levels

Construction generates vibrations from a range of equipment and activities. Quantitative vibration assessments can be [necessary](#) for construction projects involving vibration intensive activities such as blasting, pile-driving, vibratory compaction, etc. [and/or](#) within proximity of sensitive sites or structures.

Vibration source levels for various construction equipment are documented in Table 7-4 of the FTA impact assessment manual. Of the equipment documented, pile-driving is reported as the most vibration-intensive activity with PPVs (at 25 feet) ranging from 0.17 in/s to 1.518 in/s. The excerpted table below lists the typical and maximum vibration levels generated by two types of pile driving.

Equipment	Source Level (PPV @ 25', in/s)	Source Level (VdB @ 25')
Impact Pile Driving (Max)	1.518	112
Impact Pile Driving (Typical)	0.644	104
Sonic Pile Driving (Max)	0.734	105
Sonic Pile Driving (Typical)	0.17	93

Table 2 - Pile Driving Vibration Reference Levels (Table 7-4)

Pile driving vibration levels can vary significantly between tests based on equipment type and soil conditions. In addition to the publicly available (FTA) data for pile driving vibration source levels, empirical measurements have been obtained for both impact and vibratory pile driving within the bay area and may be more representative of soil conditions near the project site than the FTA reference data. Maximum PPV levels were obtained for several tests at constant distances and have been averaged in the data presented below for comparison to the FTA data:

Equipment	Source Level (PPV @ 12', in/s)
Impact Pile Driving	0.965
Sonic Pile Driving	0.814

Table 3 - Empirical Pile Driving Reference Levels

4. Calculated [PPV](#) Levels at Historic Buildings

Vibration velocities at each of the three structures are evaluated based on normal propagation conditions as assumed in the FTA impact manual. Ground-borne vibration propagation is calculated based on geometric losses and soil attenuation according to the equation below.

$$PPV_{@Receiver} = PPV_{ref} * (ref/R)^{\gamma} \quad \text{Eqn.1}$$

where,

PPV _{@Receiver}	is the calculated result used to assess the potential for building damage
PPV _{ref}	is the peak particle velocity level of the vibration source at a reference distance
ref	is the reference distance of the vibration source level
R	is the distance from the nearest pile location to the receiver location
γ	is 1.5 for normal propagation conditions (generally firm soils and clays)

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Appendix I

Page 5 with Figure 2: Structural Foundation Plan and Receiver Distances

The table below summarizes the calculated vibration level at each of the adjacent historic structures due to impact type pile driving in terms of maximum PPV based on the empirical reference levels (Table 3) and compares to the established vibration criteria for potential building damage.

Calculated PPVs at Receiver Locations - Empirical Reference Data			
	Distance (ft)	Calculated Vibration Level (PPV _{@Receiver} , in/s)	Criteria (PPV, in/s)
Building 6	65	0.077	0.500
Building 10	50	0.113	
Water Tower	65	0.077	

Table 5 - Calculated Vibration Levels at Receivers using Empirical Reference Data

5. Discussion and Recommendations

The FTA vibration impact assessment methods indicates that typical impact pile driving vibration levels (PPV) will not exceed 0.23 in/s at any of the historic structures evaluated; the calculated level is significantly below the criteria for building damage of 0.5 in/s.

Maximum PPV levels are calculated to exceed 0.5 in/s at Building 10 by 0.037 in/s. This exceedance corresponds to a distance of approximately 3 feet, i.e. calculations indicate that maximum PPV levels meet the criteria of 0.5 in/s at a distance of 53 feet from the pile location.

The results based on the FTA data for impact pile driving indicate that building damage is not anticipated for the majority of pile driving activity. No impacts are anticipated for Building 6 and the Water Tower. Impact driving of piles along the southwest façade of the proposed building marginally exceeds the criteria at Building 10 when using the FTA source level data.

5.1 Construction Vibration Mitigation

The results of the vibration impact assessment using the FTA reference data may be conservatively addressed by modifying the planned construction approach of the foundation within the vicinity of Building 10. Specifically, one option is to use vibratory (sonic) pile driving for the limited number of piles within a distance of 53 feet to Building 10.

There are several assumptions in the analysis that should be considered when evaluating potential mitigation plans - the source data used, the propagation conditions assumed, and the sensitivity of the historic structures under consideration.

Considering the borderline acceptability of the FTA general vibration assessment, a vibration monitoring exercise should be considered to measure the vibration levels generated by the proposed pile driving equipment in the local soil conditions at the NASA Ames Research Center and verify assumptions made in the analysis. We understand a pilot test pile is already a requirement for the project General Contractor.

Monitoring of the test pile with geophones at various setbacks from the pile location and at the receiver locations would provide empirical evidence of the validity of the source data used in the assessment, measurement of the soil propagation conditions (γ), and allow for direct comparison to vibration criteria at the nearest facades of the historic structures.

If the pilot test results in higher-than-anticipated vibration levels, a pile monitoring program can be developed to confirm the ongoing levels do not approach building damage criteria that might warrant vibration mitigation measures.

This concludes our pile driving vibration impact assessment for the proposed research facility at Parcel 15 of the NASA Ames Research Center. Please contact us with questions or for additional information, as needed.

APPENDIX J: GRAY & PAPE PRIMARY RECORD FORM FOR BUILDING 006



GRAY & PAPE
HERITAGE MANAGEMENT

Since 1987

7508 Ridge Road
Frederick, MD 21702
301.525.6631

June 14, 2021

Johnny Wong, Principal
SmithGroup
301 Battery Street
San Francisco, CA 94111

RE: National Register of Historic Places Evaluation of Ames Research Center Building 6 for the Proposed United States Geological Survey Facility, Sunnyvale, California

Dear Mr. Wong:

Gray & Pape, Inc. (Gray & Pape) is pleased to provide SmithGroup with this evaluation of Building 6 for the proposed United States Geological Survey (USGS) Facility at the NASA Ames Research Center (ARC), Sunnyvale, California. Building 6 is located within the Area of Potential Effects (APE) of the proposed development of the USGS building and is working with NASA to complete Section 106 studies in accordance with the National Historic Preservation Act (NHPA) and its implementing regulations. As you know, a previous cultural resources survey of the project APE by Gray & Pape and SmithGroup determined that Building 6 potentially was eligible to the National Register of Historic Places (NRHP). The California Office of Historic Preservation (OHP), in a letter of June 4th 2021, requested that NASA complete a formal NRHP evaluation of Building 6.

To address this request from the OHP, Gray & Pape completed research, field studies, and analyses of Building 6. That research was completed in May of this year, in anticipation of the request from OHP. The results of the research and analyses are presented in a California Department of Parks and Recreation architectural survey form. That form is attached to this letter. In the form, Gray & Pape presents its findings that Building 6 is NRHP eligible as a contributing resource to the US NAS Sunnyvale Historic District. However, we argue that the post-1933 extensions to Building 6 do not contribute to the building's NRHP eligibility. One of these extensions is outside of the historic district's period of significance and the other extensions do not possess the integrity required to convey their historical significance.

We trust that this building evaluation is responsive to your needs at this time. If you should have any questions or need additional information, please do not hesitate to contact myself or Carrie Albee.

Best regards,

Christopher R. Polglase, M.A., RPA
Cultural Heritage Practice Leader

The following content was redacted from this public posting:

Appendix J

Pages 90-138: Primary Record Form for Building 006